



CHARTBOOK ON **National Healthcare Quality and Disparities Report** PATIENT SAFETY



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NATIONAL HEALTHCARE QUALITY AND DISPARITIES REPORT PATIENT SAFETY CHARTBOOK

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PATIENT SAFETY

This Patient Safety Chartbook is part of a family of documents and tools that support the National Healthcare Quality and Disparities Reports (QDR). The QDR are annual reports to Congress mandated in the Healthcare Research and Quality Act of 1999 (P.L. 106-129). These reports provide a comprehensive overview of the quality of health care received by the general U.S. population and disparities in care experienced by different racial, ethnic, and socioeconomic groups. The purpose of the reports is to assess the performance of our health system and to identify areas of strengths and weaknesses in the health care system along three main axes: access to health care, quality of health care, and priorities of the National Quality Strategy.

The reports are based on more than 250 measures of quality and disparities covering a broad array of health care services and settings. Data are generally available through 2013, although rates of uninsurance have been tracked through the first half of 2015. The reports are produced with the help of an Interagency Work Group led by the Agency for Healthcare Research and Quality (AHRQ) and submitted on behalf of the Secretary of Health and Human Services (HHS).

Chartbooks Organized Around Priorities of the National Quality Strategy

- 1. Making care safer by reducing harm caused in the delivery of care.**
2. Ensuring that each person and family is engaged as partners in their care.
3. Promoting effective communication and coordination of care.
4. Promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease.
5. Working with communities to promote wide use of best practices to enable healthy living.
6. Making quality care more affordable for individuals, families, employers, and governments by developing and spreading new health care delivery models.

Patient Safety is one of the six national priorities identified by the National Quality Strategy (<http://www.ahrq.gov/workingforquality/index.html>).

The National Quality Strategy has identified three long-term goals related to patient safety: reduce preventable hospital admissions and readmissions, reduce the incidence of adverse health care-associated conditions, and reduce harm from inappropriate or unnecessary care.

This chartbook focuses on adverse health care-associated conditions and harm from care. Preventable admissions and readmissions can result from problems with patient safety or problems with care coordination. We have chosen to include measures of preventable admissions and readmissions in the Care Coordination chartbook.

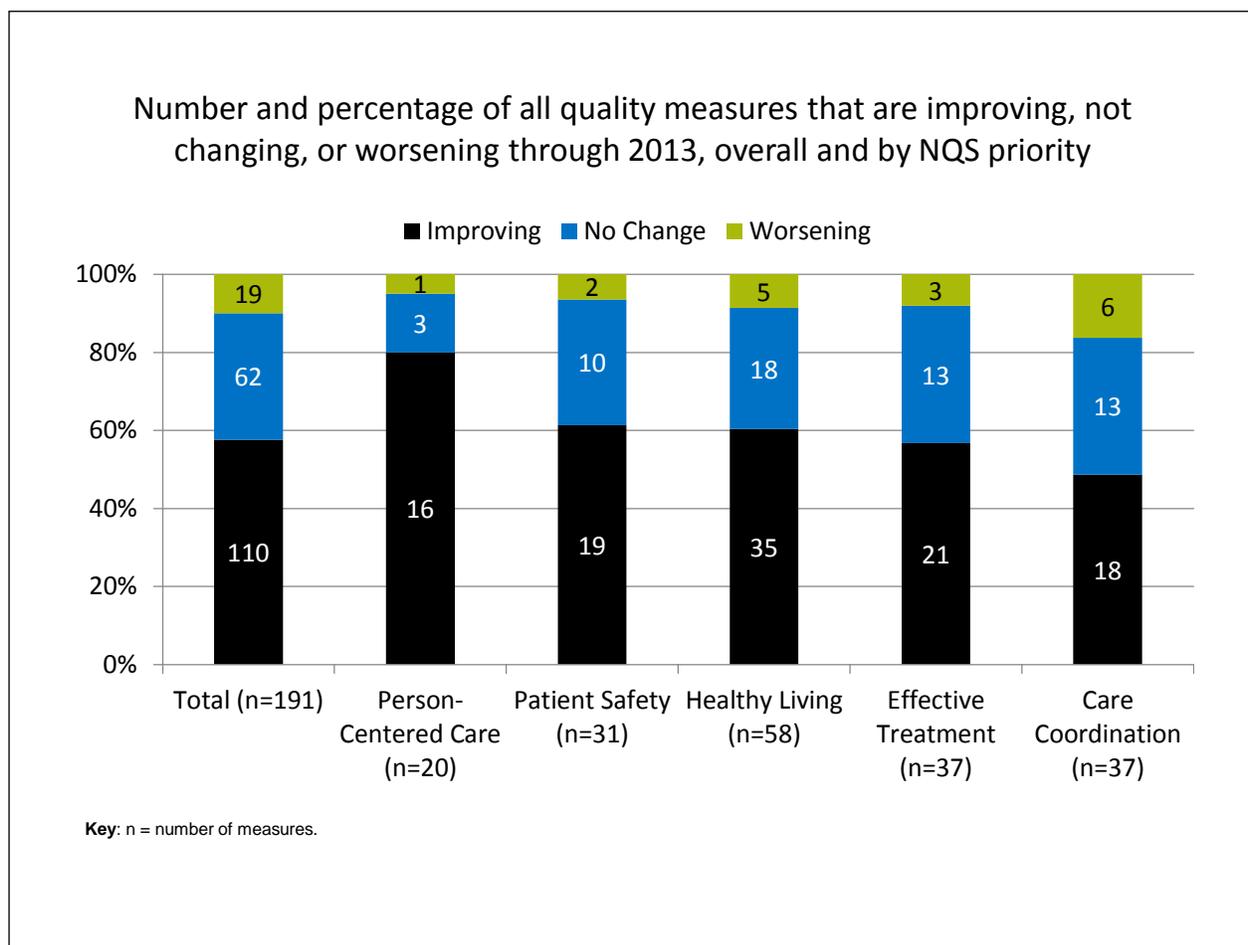
Chartbook Contents

This chartbook includes:

- Summary of trends across measures of Patient Safety from the QDR.
- Figures illustrating select measures of Patient Safety.

Introduction and Methods contains information about methods used in the chartbook. A Data Query tool (<http://nhqrnet.ahrq.gov/inhqrdr/data/query>) provides access to all data tables.

Summary of Trends Across National Quality Strategy Priorities

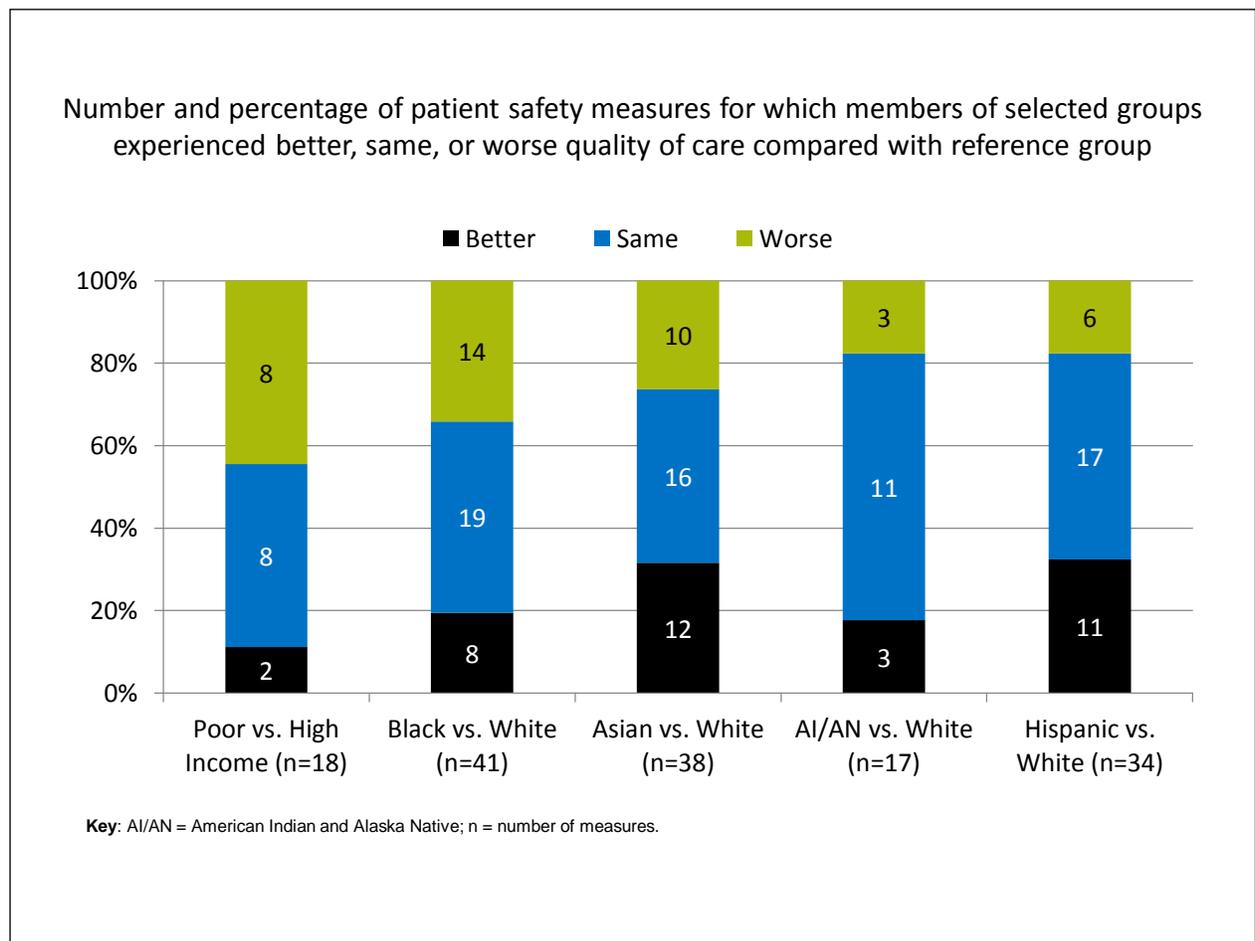


Note: For most measures, trend data are available from 2001-2002 to 2012. For each measure with at least four estimates over time, weighted log-linear regression is used to calculate average annual percentage change and to assess statistical significance. Measures are aligned so that positive change indicates improved access to care.

- **Improving** = Rates of change are positive at 1% per year or greater and are statistically significant.
- **No Change** = Rate of change is less than 1% per year or is not statistically significant.
- **Worsening** = Rates of change are negative at -1% per year or greater and are statistically significant.

- Through 2013, across a broad spectrum of measures of health care quality, 60% showed improvement (black).
- About 80% of measures of Person-Centered Care improved.
- About 60% of measures of Effective Treatment, Healthy Living, and Patient Safety improved.
- Fewer than half of measures of Care Coordination improved.
- There are insufficient numbers of reliable measures of Care Affordability to summarize in this way.

Summary of Quality Disparities



Note: Poor indicates family income less than the Federal poverty level; High Income indicates family income four times the Federal poverty level or greater. Numbers of measures differ across groups because of sample size limitations. For most measures, data from 2012 are shown. The relative difference between a selected group and its reference group is used to assess disparities.

- **Better** = Selected group received better quality of care than reference group. Differences are statistically significant, are equal to or larger than 10%, and favor the selected group.
- **Same** = Selected group and reference group received about the same quality of care. Differences are not statistically significant or are smaller than 10%.
- **Worse** = Selected group received worse quality of care than reference group. Differences are statistically significant, are equal to or larger than 10%, and favor the reference group.

- People in poor households received worse care than people in high-income households for about 45% of patient safety measures.
- Blacks received worse care than Whites for about 20% of patient safety measures, and Asians received worse care than Whites for about 30% of patient safety measures.

Patient Safety Measures With Disparities That Were Getting Smaller Over Time

Note: **Bold** indicates disparities that were eliminated.

- Black vs. White Gap:
 - Admissions with central venous catheter-related bloodstream infection per 1,000 medical and surgical discharges of length 2 or more days
 - Postoperative pulmonary embolism or deep vein thrombosis per 1,000 surgical admissions
 - Postoperative respiratory failure per 1,000 elective-surgery admissions
 - **Admissions with iatrogenic pneumothorax per 1,000 discharges**
- Poor vs. High Income Gap:
 - Admissions with accidental puncture or laceration during procedure per 1,000 medical and surgical admissions, age less than 18 years
- Hispanic vs. Non-Hispanic White Gap:
 - **Adult surgery patients with postoperative catheter-associated urinary tract infection**
- Asian vs. White Gap:
 - Deaths per 1,000 elective-surgery admissions having developed specified complications of care during hospitalization

Patient Safety Measures That Developed New Disparities

- Asian vs. White Gap:
 - Accidental puncture or laceration during procedure per 1,000 medical and surgical admissions, age 18 and over
 - Home health care patients who get better at taking their medication correctly
 - Obstetric trauma per 1,000 instrument-assisted vaginal deliveries
- Hispanic vs. Non-Hispanic White Gap:
 - Postoperative physiologic and metabolic derangements per 1,000 elective-surgery admissions

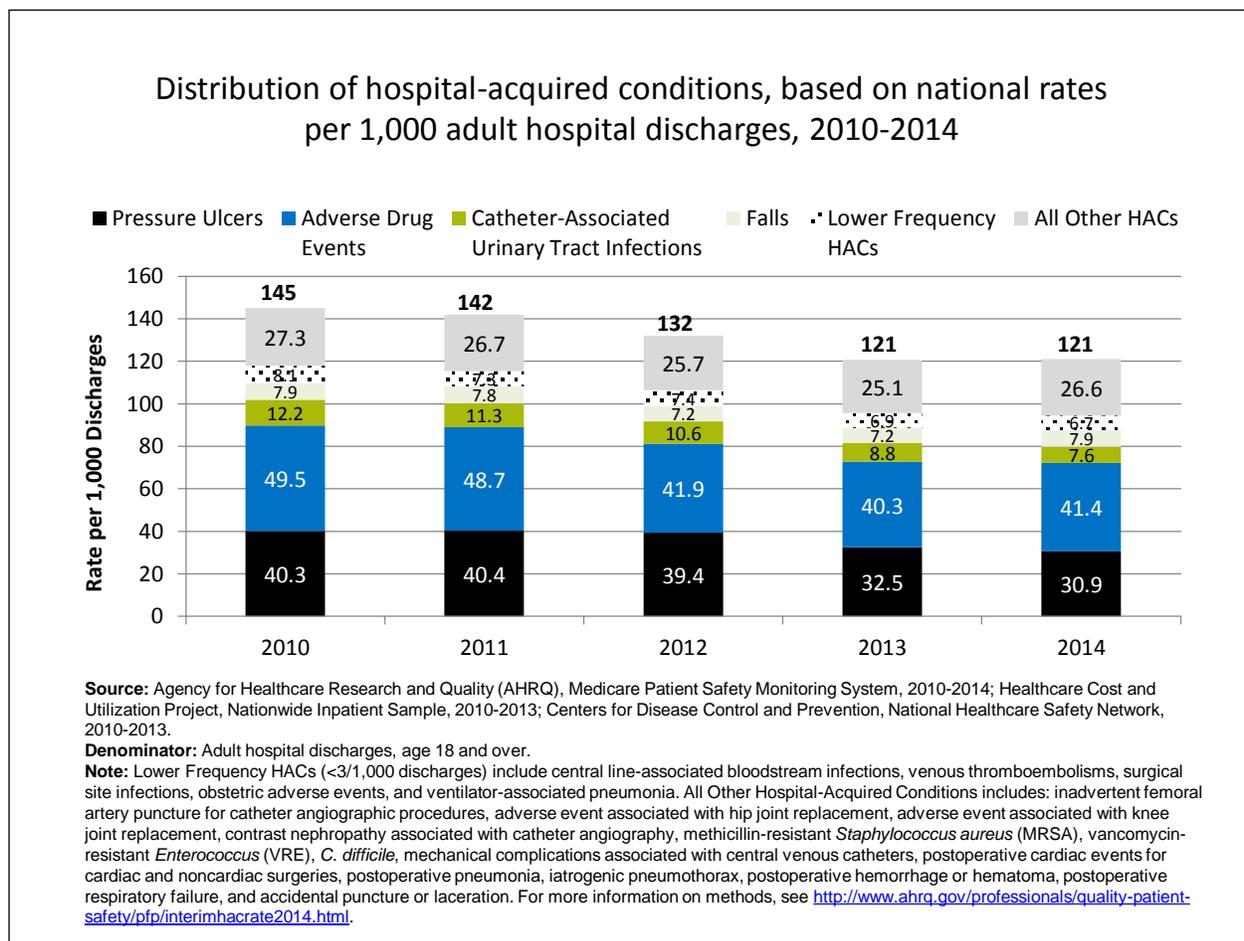
Measures of Patient Safety

- Summary of information on patient safety from the National Healthcare Quality and Disparities Report
- Individual measures of patient safety, overall and by age, sex, race, ethnicity, income, education, insurance, birth weight, health status, and presence of various health conditions
- Measures of patient safety by setting:
 - Hospitals
 - Nursing homes
 - Home health
 - Ambulatory care
 - All settings: Infrastructure

Patient Safety in the Hospital Setting

- Hospitals are a common setting for patient safety events:
 - Many patients admitted to the hospital are in a clinically compromised state.
 - Care often includes the use of invasive devices and procedures, increasing patients' risk for infection and harm.
- Measures include:
 - Overall hospital-acquired conditions (HACs).
 - Healthcare-associated infections (HAIs).
 - Procedure-related events.

Distribution of Hospital-Acquired Conditions



- **Importance:** Hospital-acquired conditions (HACs) are conditions that patients did not have upon hospital admission, but which developed during the patient’s hospital stay. They can lead to poor patient outcomes and increased spending on health care. HACs are often preventable.
- **Overall Rate:**
 - In 2014, the overall HAC rate was 121 per 1,000 hospital discharges. Adverse drug events (41.4 per 1,000 hospital discharges) accounted for 34.2% of total HACs and pressure ulcers (30.9 per 1,000 hospital discharges) accounted for 25.5% of the total.
- **Trends:**
 - From 2010 through 2014, the overall rate of hospital-acquired conditions declined 17%, from 145 to 121 per 1,000 hospital discharges.
 - Among the most frequent HACs, between 2010 and 2014, the rate of pressure ulcers decreased the most, from 40.3 per 1,000 discharges (more than 1.3 million events) to 30.9 per 1,000 discharges (about 1 million events).

- During that same period, adverse drug events decreased from a rate of 49.5 per 1,000 discharges (more than 1.6 million events) to 41.4 per 1,000 discharges (fewer than 1.4 million events). The catheter-associated urinary tract infection rate decreased from 12.2 to 7.6 per 1,000 discharges (400,000 and 250,000 events, respectively).
- Among the less frequent HACs, central line-associated bloodstream infections had the greatest percentage decrease in rate (67%) between 2010 and 2014. The rates of venous thromboembolism (44%), surgical site infections (17%), and obstetric events (4%) also decreased.

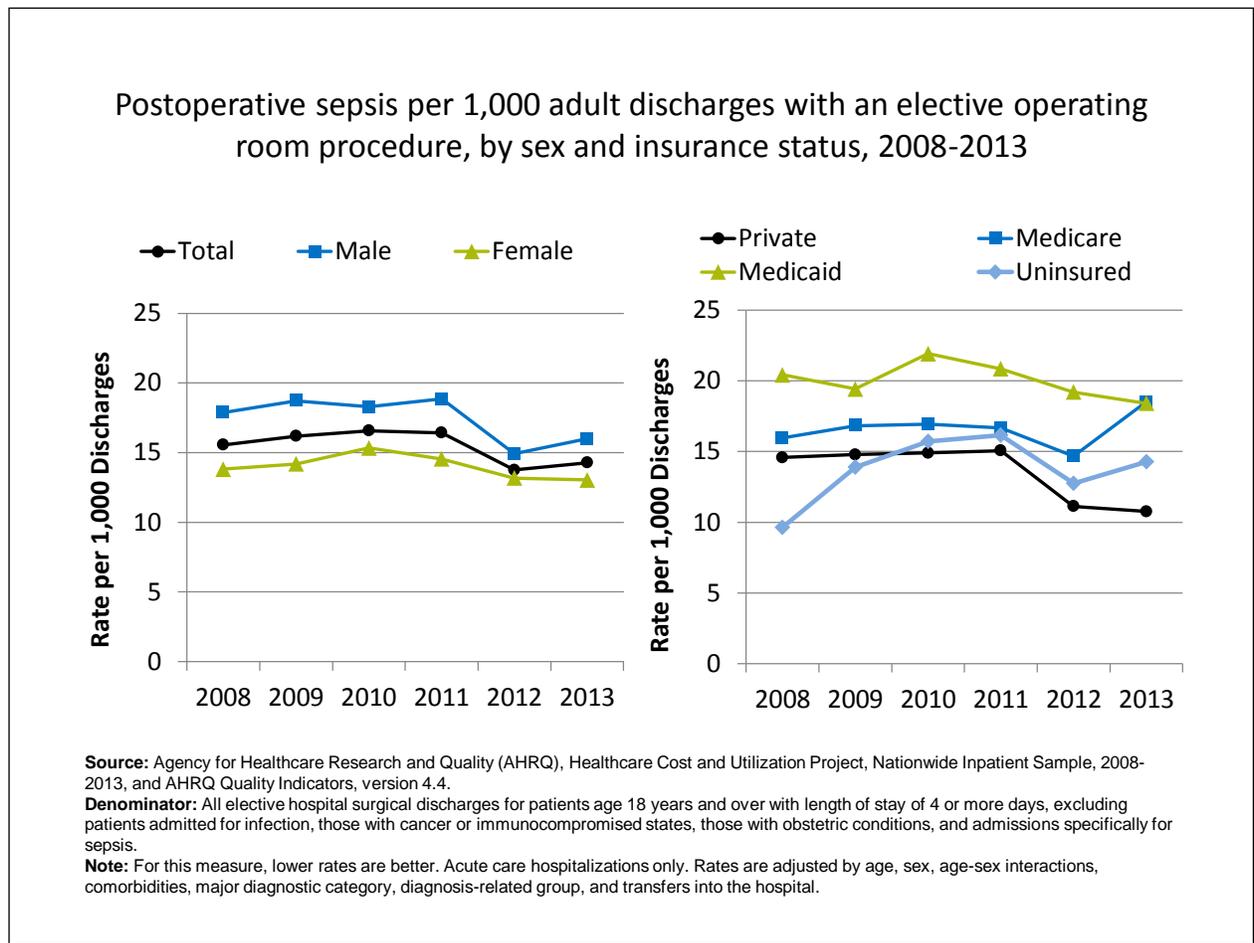
Healthcare-Associated Infections

- Infections acquired during a hospital stay are among the most common complications of hospital care.
- On any given day, about 1 in 25 hospital patients has at least one healthcare-associated infection (HAI) (CDC, 2016).
- HAIs often increase the patient's length of stay in the hospital, risk of mortality, and hospital costs.
- New infections in critically ill infants, children, and other patients generally reduce their chances for recovery.
- For more information, see the PSNet link to Patient Safety Primer: Health Care-Associated Infections at <https://psnet.ahrq.gov/primers/primer/7>.

Measures of Patient Safety in the Hospital Setting: HAIs

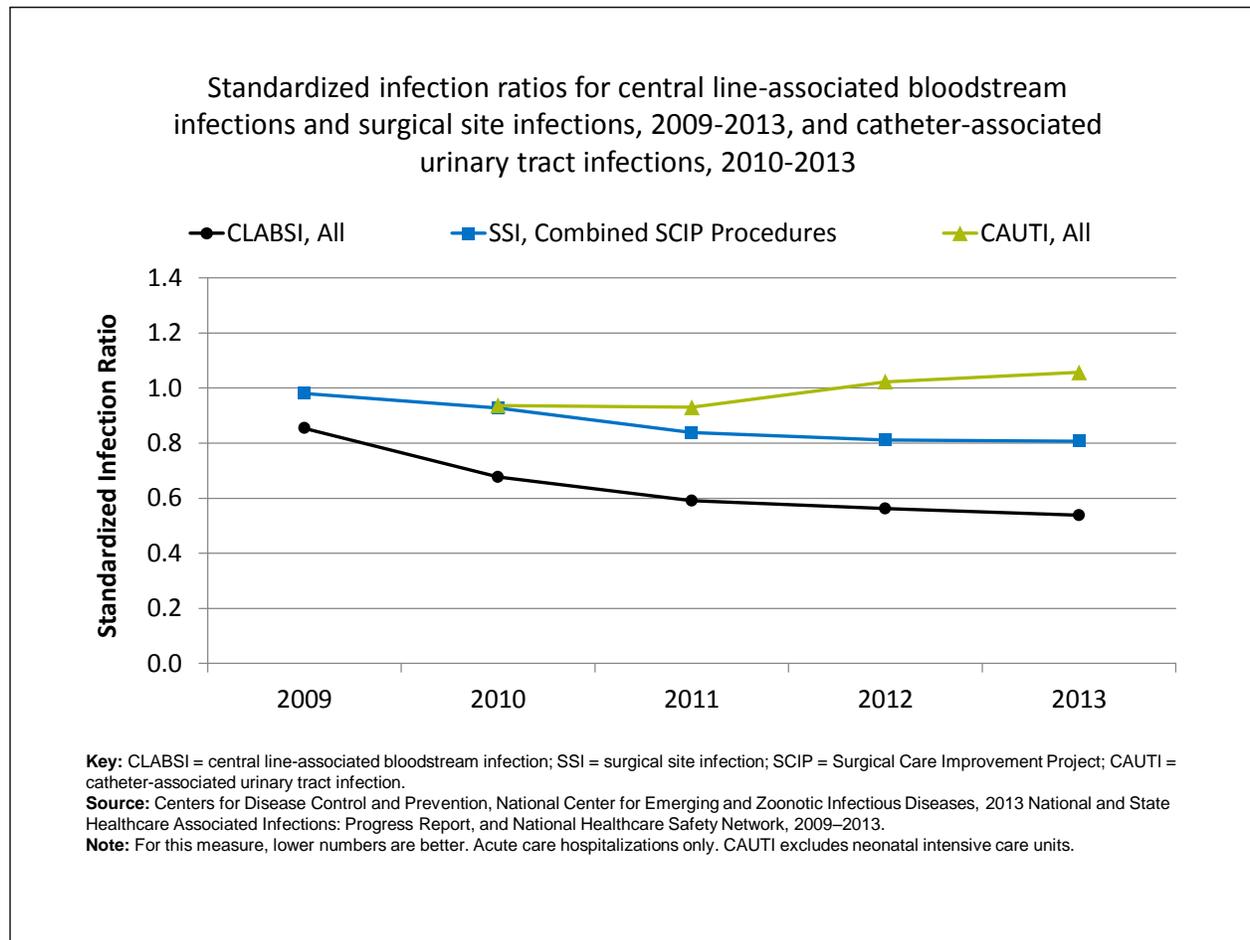
- Postoperative sepsis per 1,000 adult discharges with an elective operating room procedure
- Standardized infection ratios (SIRs) for central line-associated bloodstream infections, surgical site infections, and catheter-associated urinary tract infections (CAUTIs)
 - SIRs compare the observed number of infections reported to the National Healthcare Safety Network (NHSN) during a year to the predicted number of infections based on the January 2006 to December 2008 referent period for central line-associated bloodstream infections (CLABSIs) and surgical site infections (SSIs) and the calendar year 2009 referent period for CAUTIs.
- Change in SIRs for CAUTIs
- Bloodstream infections per 1,000 central-line days
 - In neonatal intensive care units (NICUs)
 - In adult intensive care units

Postoperative Sepsis



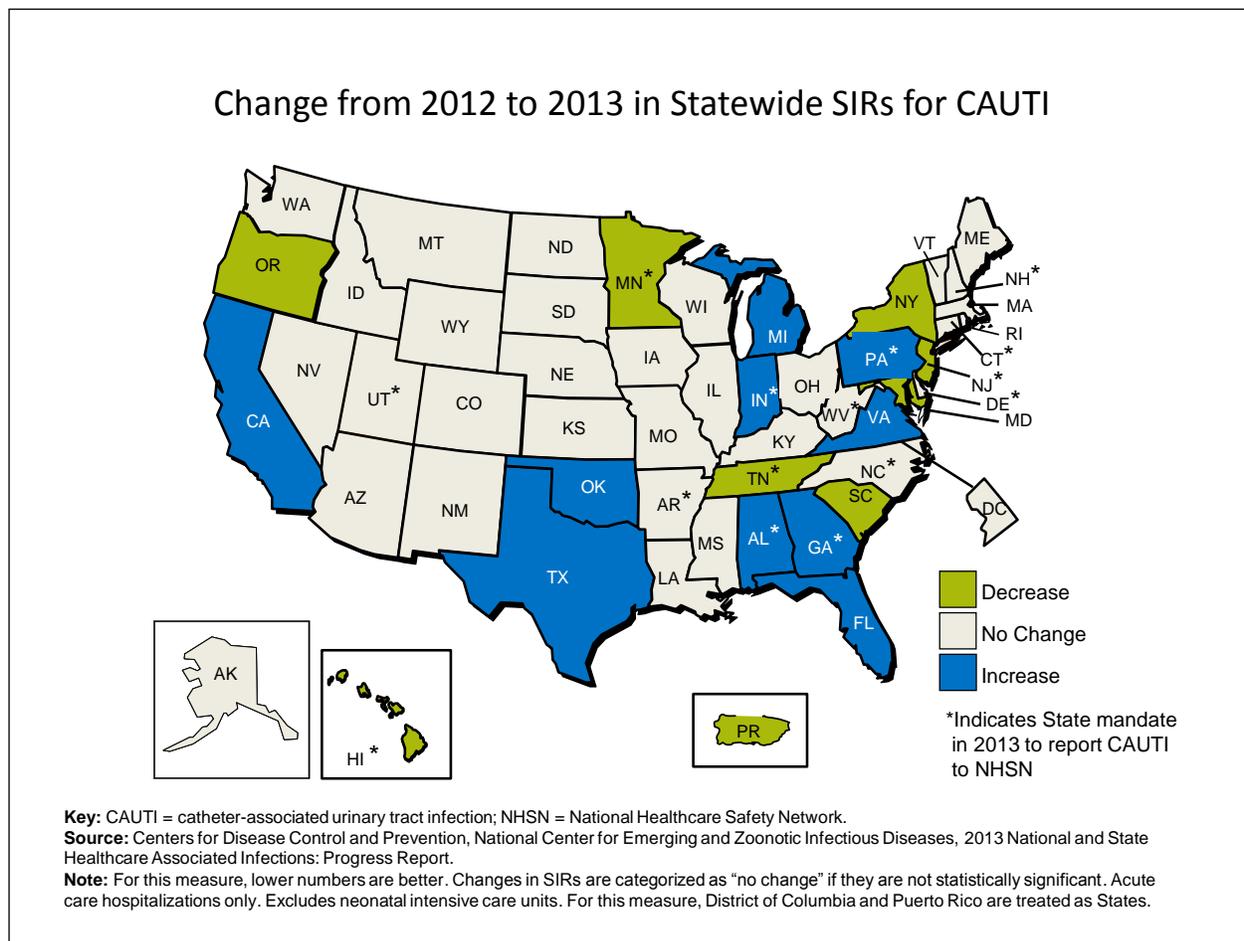
- **Overall Rate:** In 2013, the postoperative sepsis rate was 14.3 per 1,000 adult discharges with an elective operating room procedure.
- **Groups With Disparities:**
 - In 2013, female patients had a lower rate of postoperative sepsis than male patients.
 - Also in 2013, patients with Medicaid and those with Medicare had worse sepsis rates than privately insured patients.
 - From 2008 to 2013, there were no statistically significant changes in the gap between males and females.
 - From 2008 to 2013, there were no statistically significant changes in the gap between privately insured patients and other insurance groups.

Standardized Infection Ratios



- Background:** SIRs compare the observed number of infections reported to the NHSN during a year to the predicted number of infections based on the January 2006 to December 2008 referent period for CLABSIs and SSIs and the calendar year 2009 referent period for CAUTIs. For example, a ratio of .81 for SSIs in 2013 indicates that 19% fewer SSIs were observed in 2013 than predicted based on the 2006–2008 baseline period. Data are from all intensive care units, wards, and other non-critical care locations. CLABSI data also include neonatal intensive care units but exclude long-term acute care hospitals and inpatient rehabilitation facilities. SCIP procedures are those performed on adults. Number of facilities reporting to NHSN roughly tripled from 2009 to 2013. Procedures include abdominal aortic aneurysm repair, peripheral vascular bypass surgery, coronary artery bypass graft with both chest and donor site incisions or with chest incision only, other cardiac surgery, colon surgery, rectal surgery, hip arthroplasty, abdominal hysterectomy, knee arthroplasty, and vaginal hysterectomy.
- Overall Rate:** In 2013, the overall SIR for CLABSIs among intensive care units in the 50 States, District of Columbia, and Puerto Rico was 0.54 and the overall SIR for CAUTIs was 1.06. The overall SIR for SSIs following 10 common procedures in adults was 0.81.
- Trends:** From 2009 to 2013, the SIR for CLABSIs improved and, from 2010 to 2013, the SIR for CAUTIs worsened for facilities reporting to NHSN.

Change in Statewide SIRs



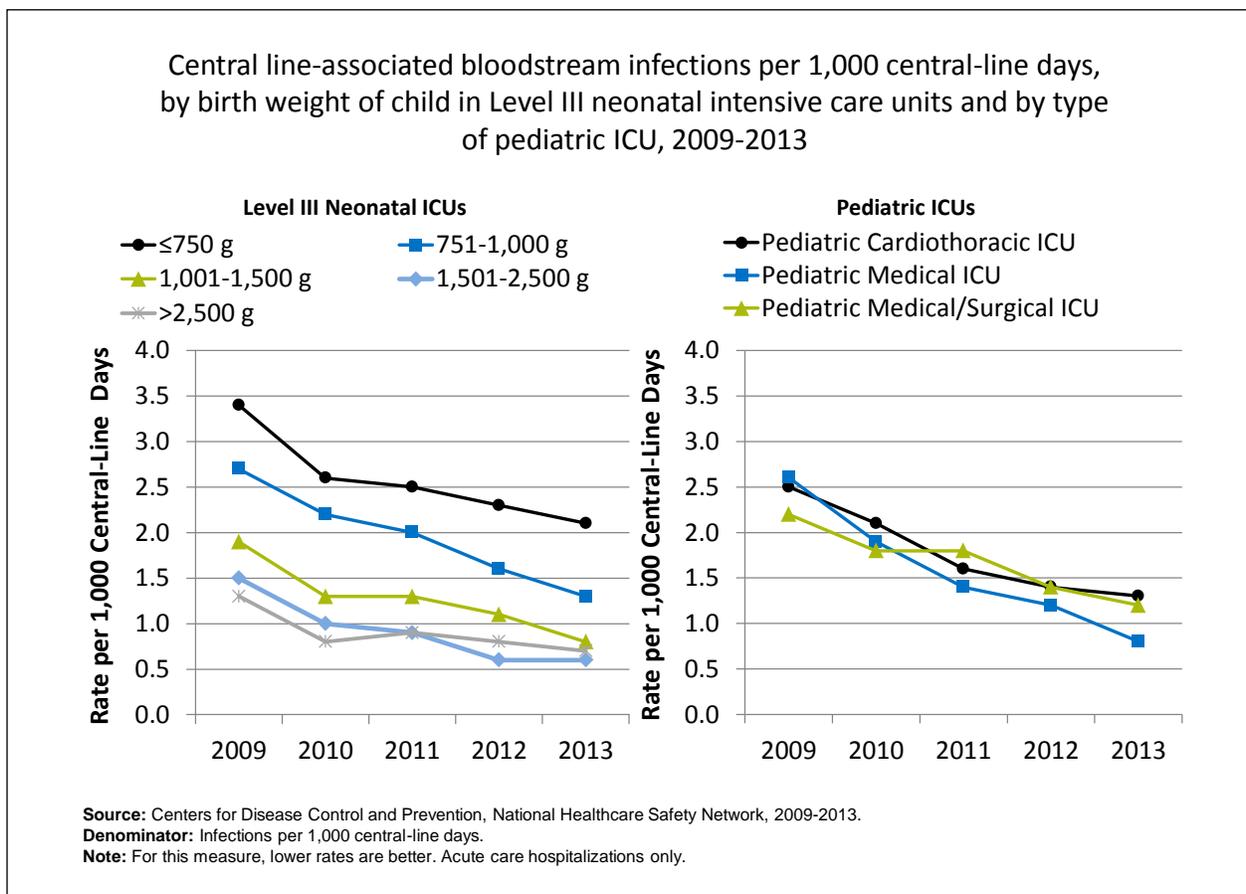
- **Geographic Variation:** In 2013, 31 States had SIRs greater than 1, indicating that, on average, their hospitals had more CAUTIs than hospitals of similar type and size during the 2009 referent period. The States were Alaska, Arkansas, Arizona, Connecticut, District of Columbia, Delaware, Georgia, Idaho, Indiana, Kansas, Kentucky, Massachusetts, Maryland, Maine, Michigan, Minnesota, Missouri, Mississippi, North Carolina, New Jersey, Nevada, New York, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, and Washington.
- **Trends:** Of 52 reporting States, 33 had no change from 2012 to 2013 in CAUTI SIRs, 9 decreased, and 10 increased.

Toolkit for Reducing Catheter-Associated Urinary Tract Infections in Hospitals

- **Purpose:** To help hospitals prevent catheter-associated urinary tract infections (CAUTIs) and improve safety culture
- **Method:** Implementing evidence-based, practical resources and concepts from the Comprehensive Unit-based Safety Program
- **Intended User:** Hospital facilities
- **Available Tools:** Guides, checklists, webinars, learning modules, data interpretation guides

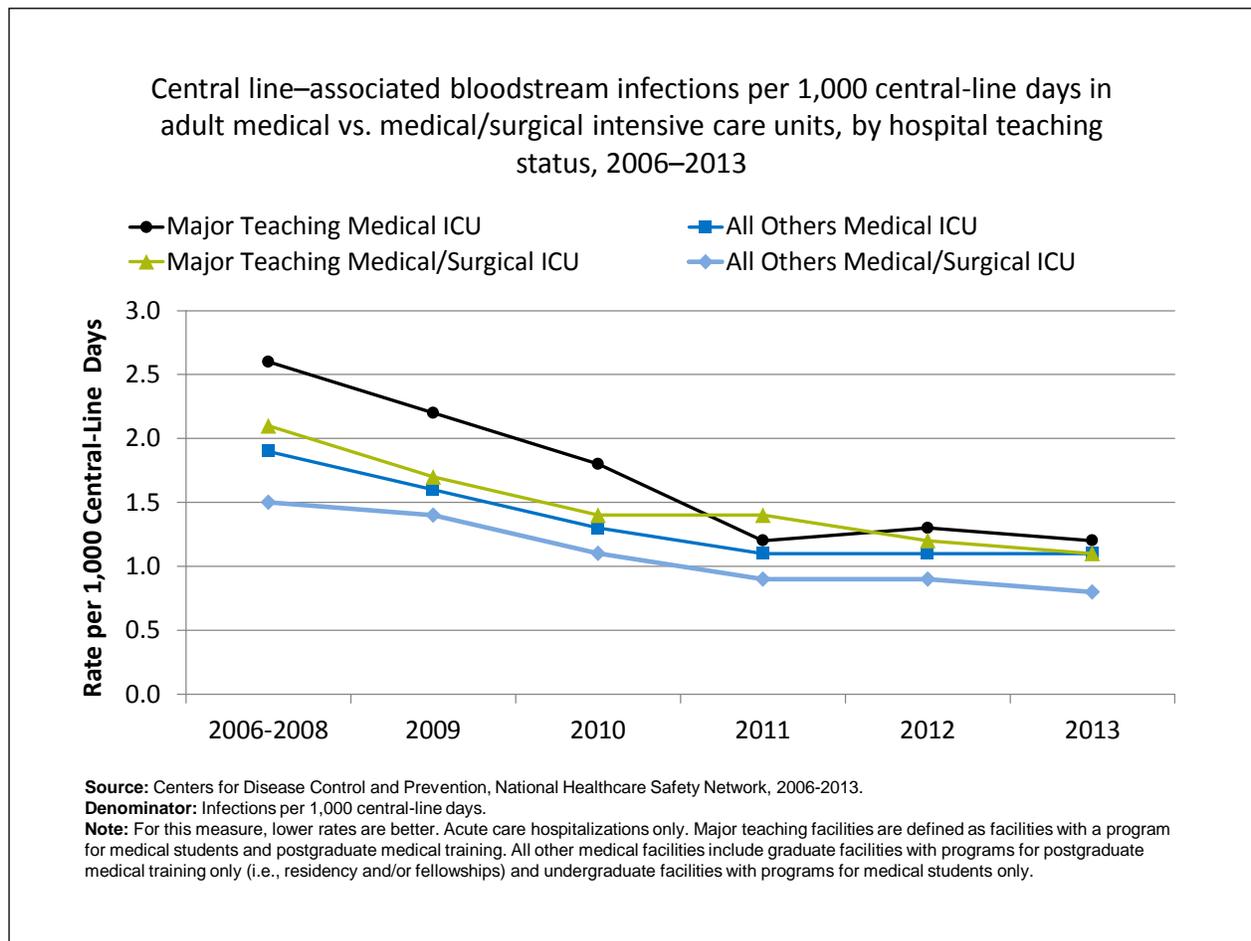
- Potential Measures of Effectiveness:
 - Number of symptomatic CAUTIs attributable to each unit by month
 - Days since last CAUTI
- Link: <http://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/cauti-hospitals/Index.html>

Central Line-Associated Bloodstream Infections in Neonatal Intensive Care Units



- **Overall Rates:**
 - In 2013, among patients in Level III NICUs, pooled mean CLABSI rates ranged from a low of 0.6 infections per 1,000 central-line days among neonates born at 1,501 to 2,500 grams to a high of 2.1 infections per 1,000 central-line days among neonates born at less than or equal to 750 grams.
- **Trends:**
 - The rate of CLABSI among pediatric cardiothoracic ICUs was 2.5 in 2009 and 1.3 in 2013; among pediatric medical ICUs, 2.6 in 2009 and 0.8 in 2013; and among pediatric medical/surgical ICUs, 2.2 in 2009 and 1.2 in 2013.

Central Line-Associated Bloodstream Infections in Adult Intensive Care Units



• **Trends:**

- Between 2006-2008 (combined) and 2013, there was a 46% decrease in CLABSIs (data not shown).
- From 2006-2008 (combined) to 2013, rates of CLABSIs in hospitals decreased 53.8% among adult medical ICU patients in hospitals with major teaching programs, 47.6% among adult medical/surgical ICU patients in hospitals with major teaching programs, 42.1% among adult medical ICU patients in all other hospitals, and 46.7% among adult medical/surgical ICU patients in all other hospitals.

Tools for Reducing Central Line-Associated Bloodstream Infections

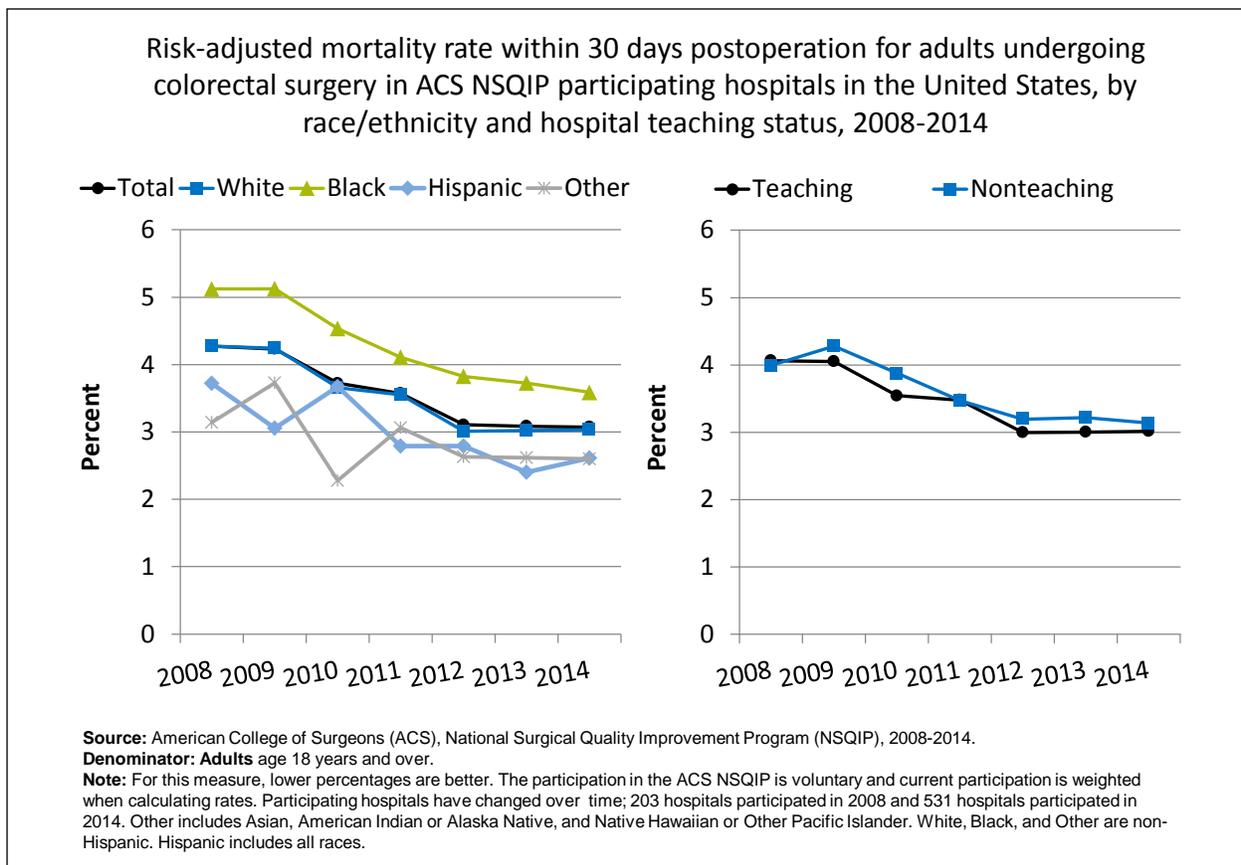
- Purpose: To help hospitals prevent central line-associated bloodstream infections (CLABSIs) and improve safety culture
- Methods: Implementing evidence-based, practical resources and concepts from the Comprehensive Unit-based Safety Program (CUSP)
- Intended user: Hospital facilities
- Available tools: Checklists, preventable incidence calculator, audit form, event report template

- Impact:
 - Through use of the CUSP toolkit and CLABSI tools, more than 100 intensive care units in Michigan have nearly eliminated CLABSIs.
 - Nationwide, the use of this toolkit has helped more than 1,000 hospitals reduce rates of CLABSI by 41% in aggregate. See <http://www.ahrq.gov/workingforquality/pias/mhhakcpia.htm> and <http://www.ahrq.gov/professionals/education/curriculum-tools/clabsitools/index.html#purpose>.

Procedure-Related Events

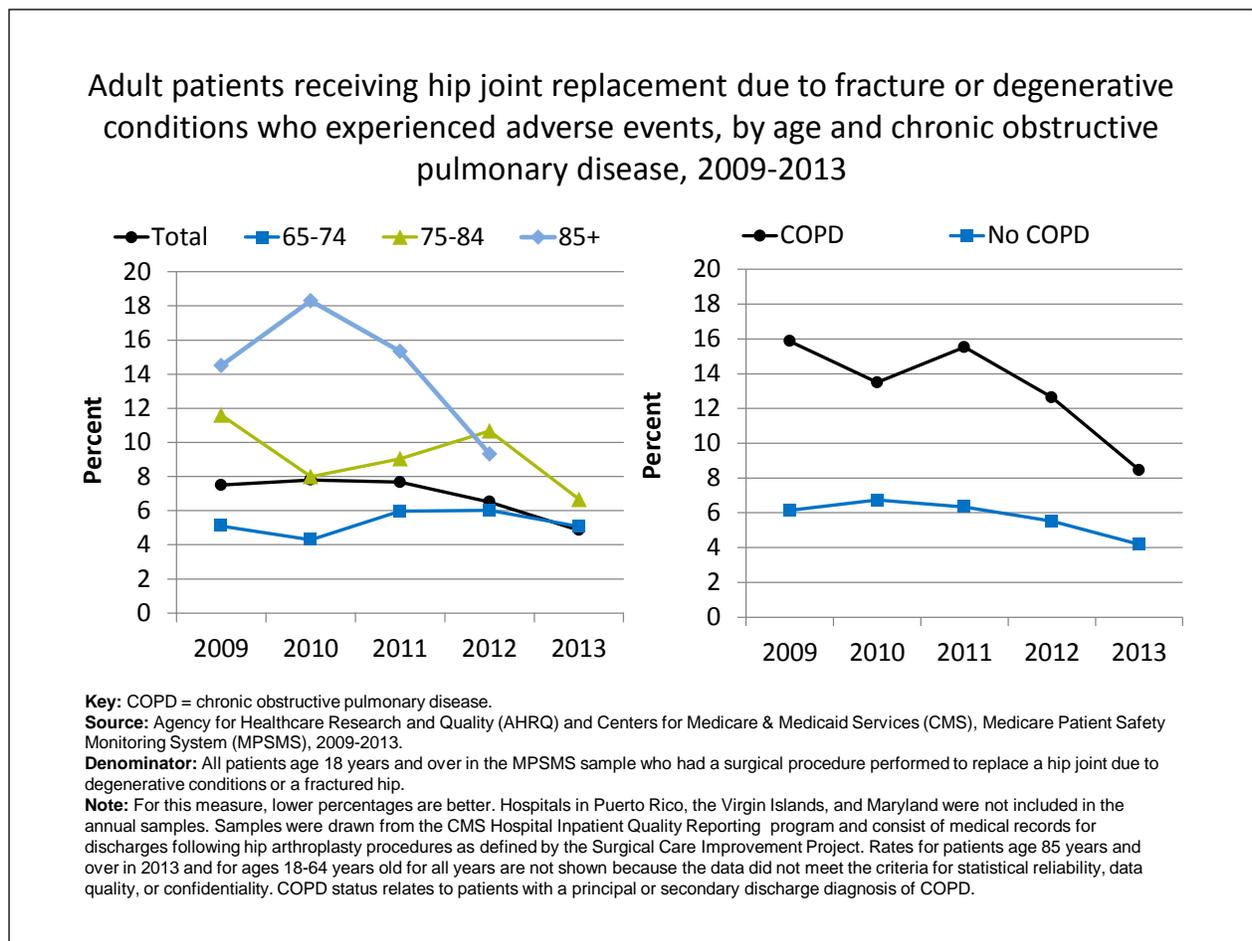
- More than 40 million operative procedures are performed in the United States each year.
- Postoperative adverse events are not uncommon and increase both hospitalization length and cost (AHRQ, 2013).
- Measures include:
 - Risk-adjusted mortality at 30 days postoperation for colorectal surgery performed in adults
 - Percentage of adult patients receiving hip joint replacement (because of fracture or degenerative conditions) who experienced adverse events
 - Percentage of adults with mechanical adverse events associated with central venous catheter placement

Postoperative Mortality



- **Importance:** Colorectal procedures have high rates of postoperative complications. Nonadherence to evidence-based best practices is associated with an increased risk of these complications (Arriaga, et al., 2009).
- **Overall Rate:** In 2014, the risk-adjusted mortality rate was 3.1% among patients undergoing colorectal surgeries at ACS NSQIP participating hospitals.
- **Trends:** From 2008 to 2014, 30-day postoperative mortality after colorectal surgery improved.
- **Groups With Disparities:**
 - In 2014, the percentage of patients with 30-day postoperative mortality was worse for Blacks (3.6%) compared with Whites (3.0%).
 - From 2008 to 2014, there were no statistically significant changes in the gap between minority groups and Whites in the percentage of patients with 30-day postoperative mortality.

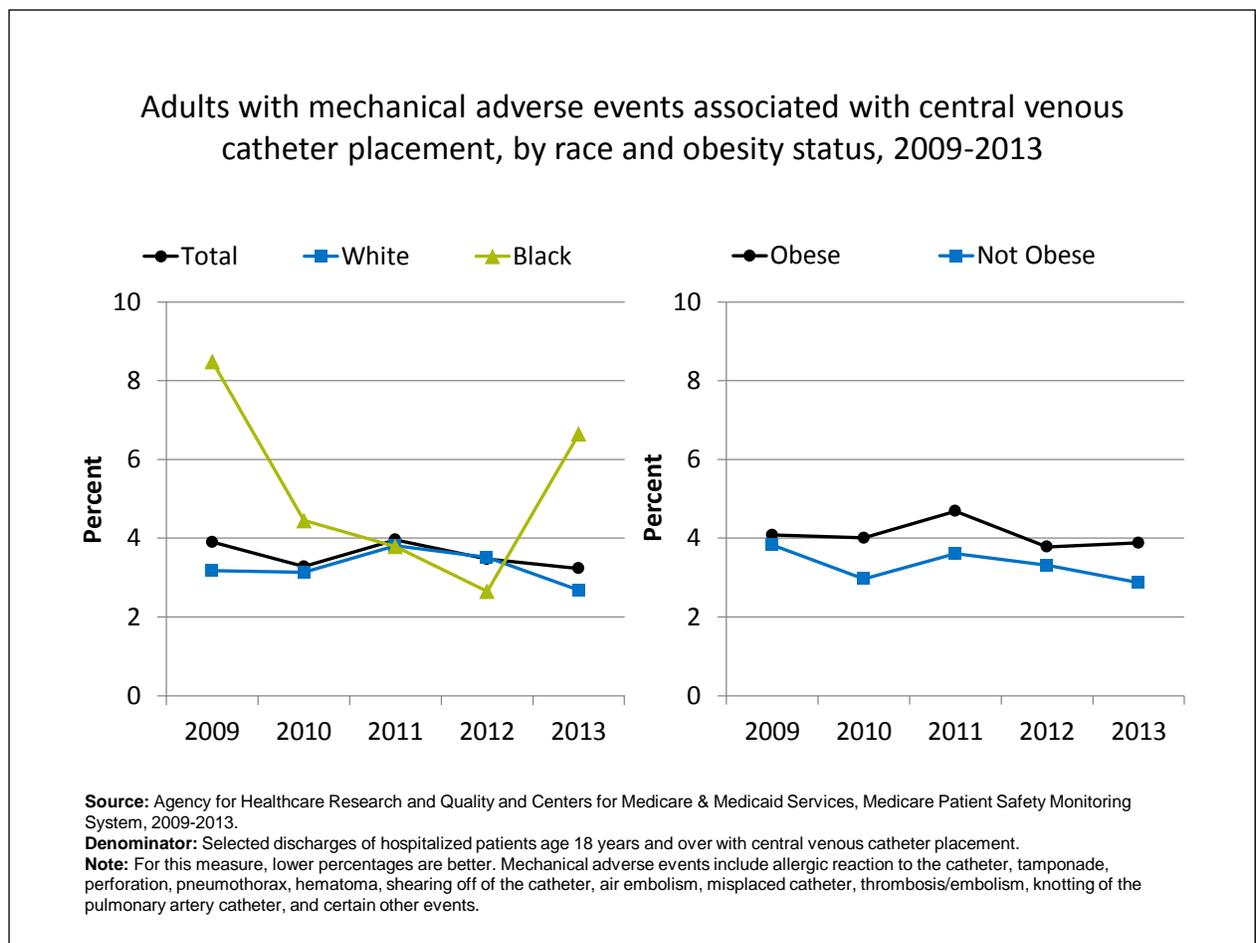
Adverse Events After Hip Joint Replacement



- **Importance:** Hip replacement is most common among older adults, who have an increased risk of adverse events after these surgeries.

- **Overall Percentage:** In 2013, 4.9% of patients receiving a hip joint replacement experienced an adverse event.
- **Trends:** From 2009 to 2013, the overall percentage of adverse events improved for patients who had a hip joint replacement due to fracture or degenerative conditions.
- **Groups With Disparities:**
 - In 2013, there were no statistically significant differences by age or COPD status in the percentage of hip replacement patients who had adverse events.
 - From 2009 to 2013, there were no statistically significant changes in the gap between patients age 75 and over and those ages 65-74 in adverse event frequencies. Similarly, there were no statistically significant changes in disparities between patients with COPD and those without COPD.

Adverse Events Associated With Central Venous Catheter Placement



- **Importance:** Central venous catheterization (CVC) allows medical personnel quick access to a patient’s bloodstream. This ease of access is important when a patient requires life-saving medications or when a physician needs to measure central venous pressure. Mechanical adverse events are most likely to occur while medical personnel are placing or maintaining the central venous catheter.

- **Overall Percentage:** In 2013, 3.2% of adults with central venous catheter placements experienced an associated mechanical adverse event.
- **Trends:** From 2009 to 2013, there were no statistically significant changes in the overall percentage of adults with mechanical adverse events associated with central venous catheter placement.
- **Groups With Disparities:**
 - In 2013, the percentage of adults with mechanical adverse events associated with CVC was worse for Blacks (6.7%) compared with Whites (2.7%). There were no statistically significant differences by obesity status.
 - From 2009 to 2013, there were no statistically significant changes in the gap between Blacks and Whites in the percentage of adults with mechanical adverse events associated with CVC.

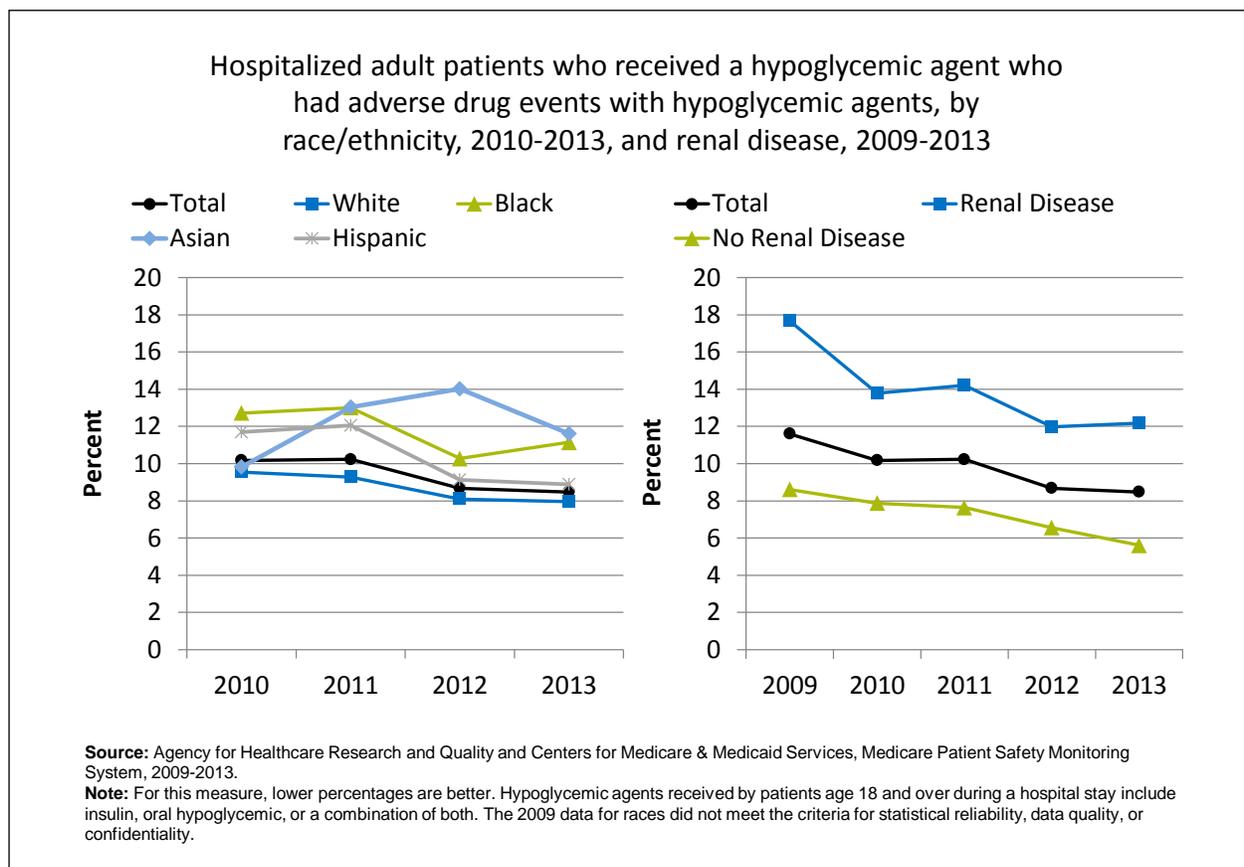
Adverse Drug Events

- An estimated 400,000 preventable ADEs occur each year in U.S hospitals, generating additional costs of \$3.5 billion in 2006 dollars (IOM, 2007).
 - An ADE is an injury—including physical harm, mental harm, or loss of function—resulting from medical intervention involving a drug.
 - For more information, see the PSNet link to Patient Safety Primer: Medication Errors <https://psnet.ahrq.gov/primers/primer/23/medication-errors>.
- The three initial targets of the HHS National Action Plan for Adverse Drug Event Prevention are:
 - Anticoagulants and related bleeding.
 - Diabetes agents and related hypoglycemia.
 - Opioids and accidental overdose, oversedation, and respiratory depression.

Measures of Patient Safety in the Hospital Setting: Adverse Drug Events

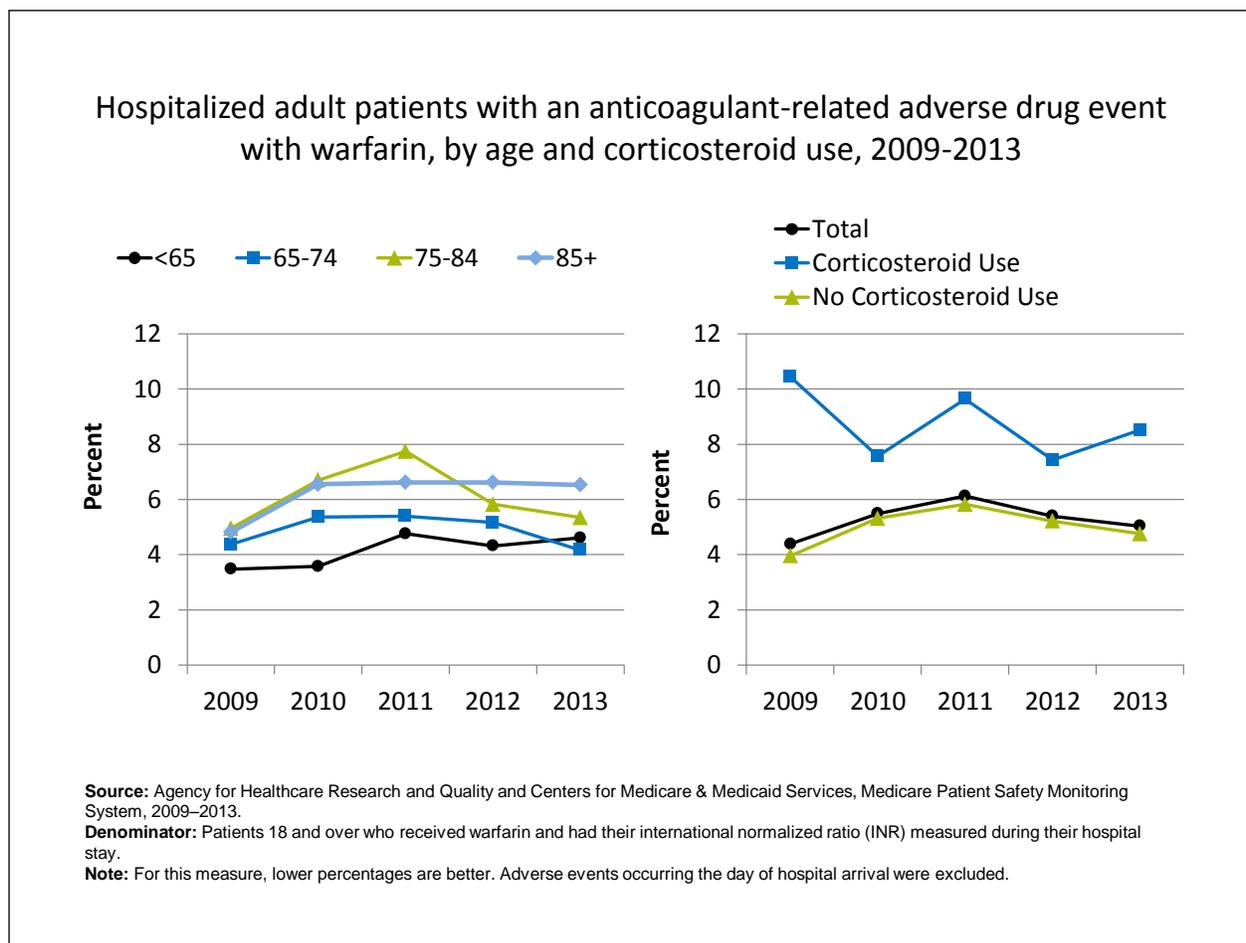
- Percentage of hospitalized adult patients who received a hypoglycemic agent and had an adverse drug event
- Percentage of hospitalized adult patients who had an anticoagulant-related adverse drug event to warfarin
- Number of opioid-related medication errors in patients of all ages

Adverse Drug Events With Hypoglycemic Agents



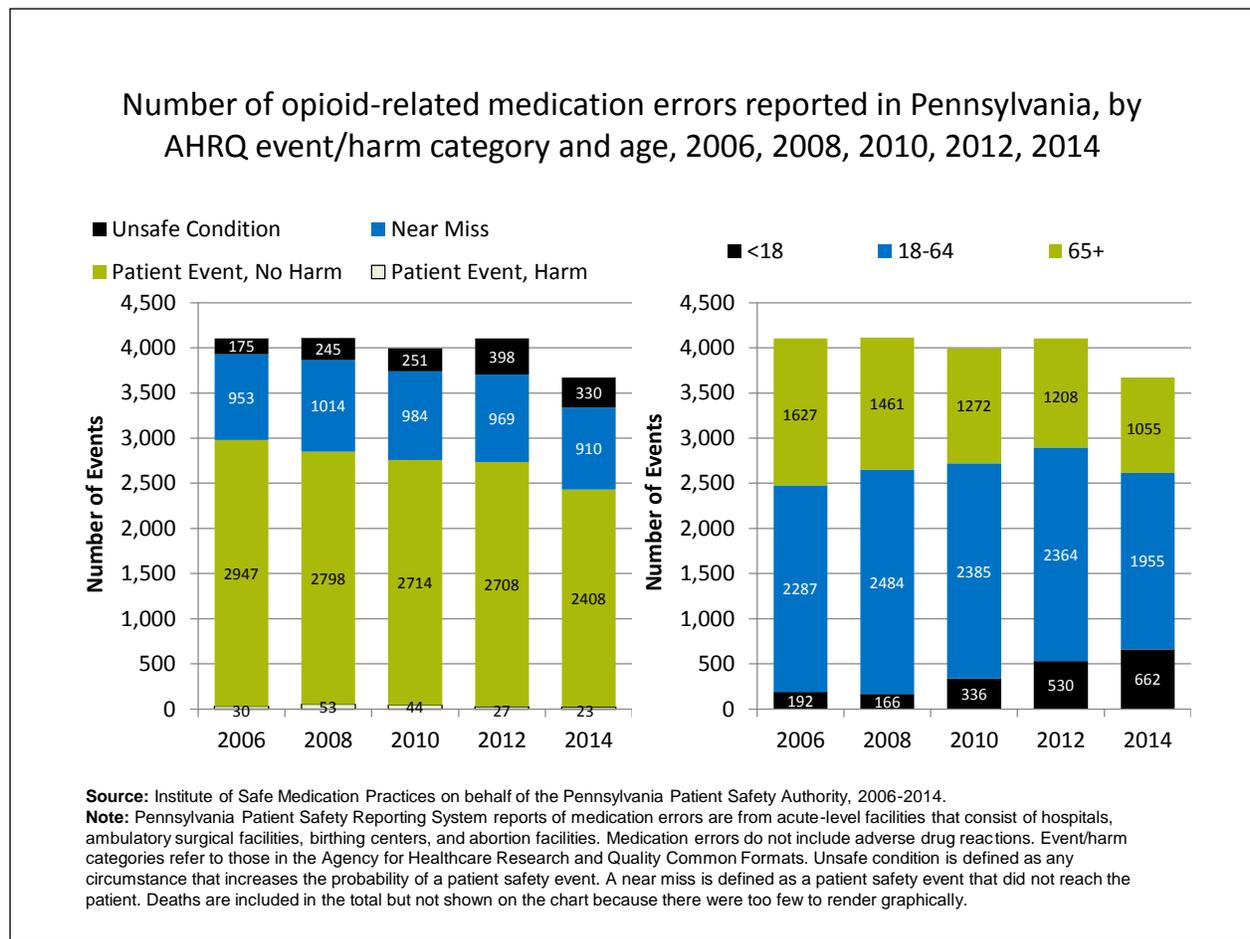
- **Importance:** Hypoglycemic agents, which are ingested orally, are typically used in patients with type II diabetes to control blood sugar levels. In some cases, diabetic patients use hypoglycemic agents together with insulin. The risk of chronic kidney disease increases twofold for people with diabetes, and renal impairment can increase the risk for adverse events related to hypoglycemic agents.
- **Overall Percentage:** In 2013, 8.5% of hospital patients receiving hypoglycemic agents had an adverse drug event.
- **Trends:** The overall percentage of adverse drug events associated with hypoglycemic agents improved from 2009 to 2013.
- **Groups With Disparities:**
 - In 2013, the percentage of hospital patients who had adverse drug events with hypoglycemic agents was higher for Blacks (11.1%) than for Whites (8%).
 - Also in 2013, the percentage of hospital patients who had adverse drug events with hypoglycemic agents was higher for those with renal disease (12.2%) than for those without renal disease (5.6%).
 - From 2010 to 2013, there were no statistically significant changes in the gap between minority groups and Whites in the percentage of patients who had adverse drug events associated with hypoglycemic agents. Similarly, there were no statistically significant changes in the gap between those with renal disease and those without.

Adverse Drug Events With Warfarin



- **Importance:** Blood clots in arteries and veins can cause a blockage of blood flow and lead to strokes and heart attacks. Anticoagulants, such as warfarin, reduce this risk but pose an increased risk of bleeding. Corticosteroids can interact with anticoagulants to raise the risk of potential bleeding complications.
- **Overall Percentage:** In 2013, 5.0% of adults using warfarin experienced an anticoagulant-related adverse drug event.
- **Trends:** From 2009 to 2013, there were no statistically significant changes in the overall percentage of hospital patients with an adverse drug event related to warfarin.
- **Groups With Disparities:**
 - In 2013, the percentage of hospital patients who had an adverse drug event to warfarin was the same regardless of corticosteroid use status.
 - From 2009 to 2013, there were no statistically significant changes in the gap between older age groups and those under age 65 in the percentage of patients who had adverse events associated with warfarin. Similarly, there were no statistically significant changes in the gap between those using corticosteroids and those not using corticosteroids.

Opioid-Related Medication Errors



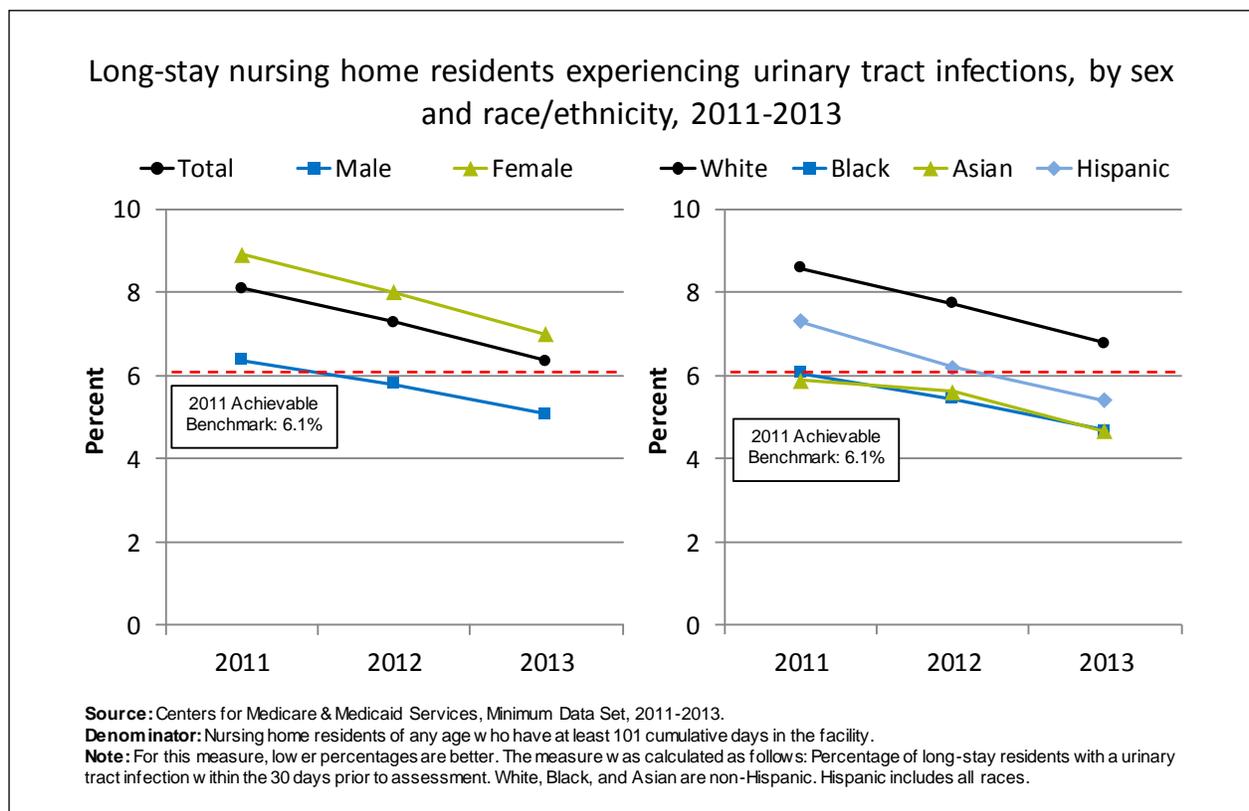
- **Importance:** Acute, malignant, and—increasingly—chronic pain often is treated or managed with prescription opioids. Reducing patient harm from the use of opioids in both inpatient and outpatient settings is a main area of focus because opioid-related adverse drug events are often preventable.
- **Trends:**
 - In Pennsylvania, the total number of medication error reports related to opioids decreased 10.6% between 2006 (4,106) and 2014 (3,672).
 - Between 24 and 54 opioid-related medication errors resulting in patient harm or death were reported from 2006 through 2014, accounting for approximately 1% of all reported opioid medication errors each year.
 - The largest share of opioid-related medication errors reported each year in Pennsylvania related to those that reached the patient but did not result in harm. Of these no-harm events reaching the patient, about one in four required monitoring and/or intervention to preclude the harm.

- Although small in number, reports of unsafe conditions increased from 4.3% (175) of total opioid-related medication error reports in 2006 to 9% (330) in 2014. Reports of unsafe conditions and near misses can provide important learning opportunities for preventing patient harm.
- **Differences Between Groups:** Reports of opioid-related medication errors involving pediatric patients increased nearly fourfold from 192 (4.7%) in 2006 to 662 (18%) in 2014. During the same period, reports of opioid-related medication errors involving older adult patients decreased from nearly 40% of the total to less than 30%.

Patient Safety in the Nursing Home Setting

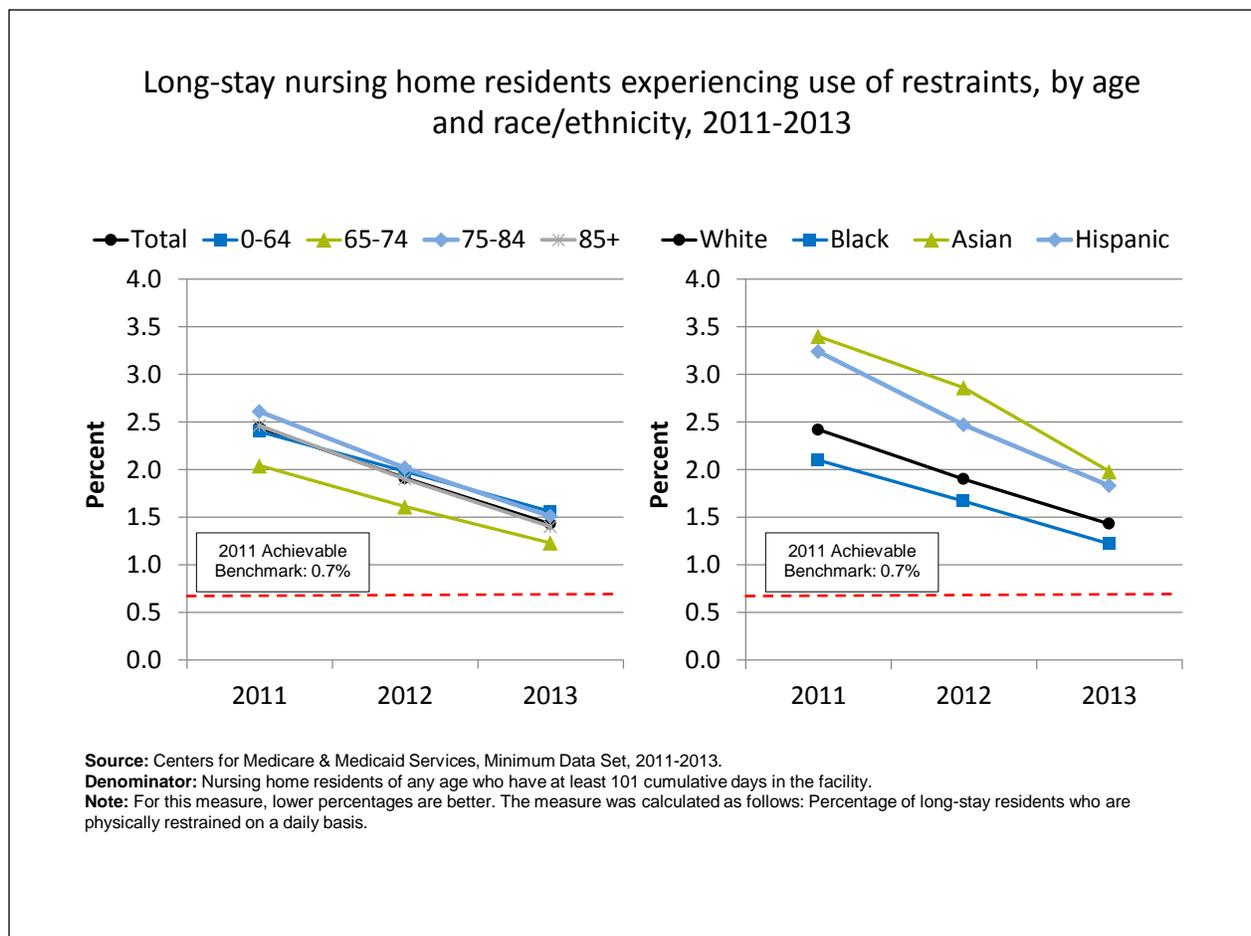
- More than 3 million people receive care in U.S. nursing homes and skilled nursing facilities each year (CDC, 2015).
- For nursing home residents, optimal care seeks to maximize quality of life and minimize unintended complications.
- Measures tracked for patients of various age ranges include:
 - Nursing home residents with urinary tract infections.
 - Nursing home residents experiencing use of restraints.
 - Nursing home residents who have pressure ulcers.
 - Nursing home residents who had a fall with major injury.
 - Nursing home residents who received antipsychotic medication.

Urinary Tract Infections



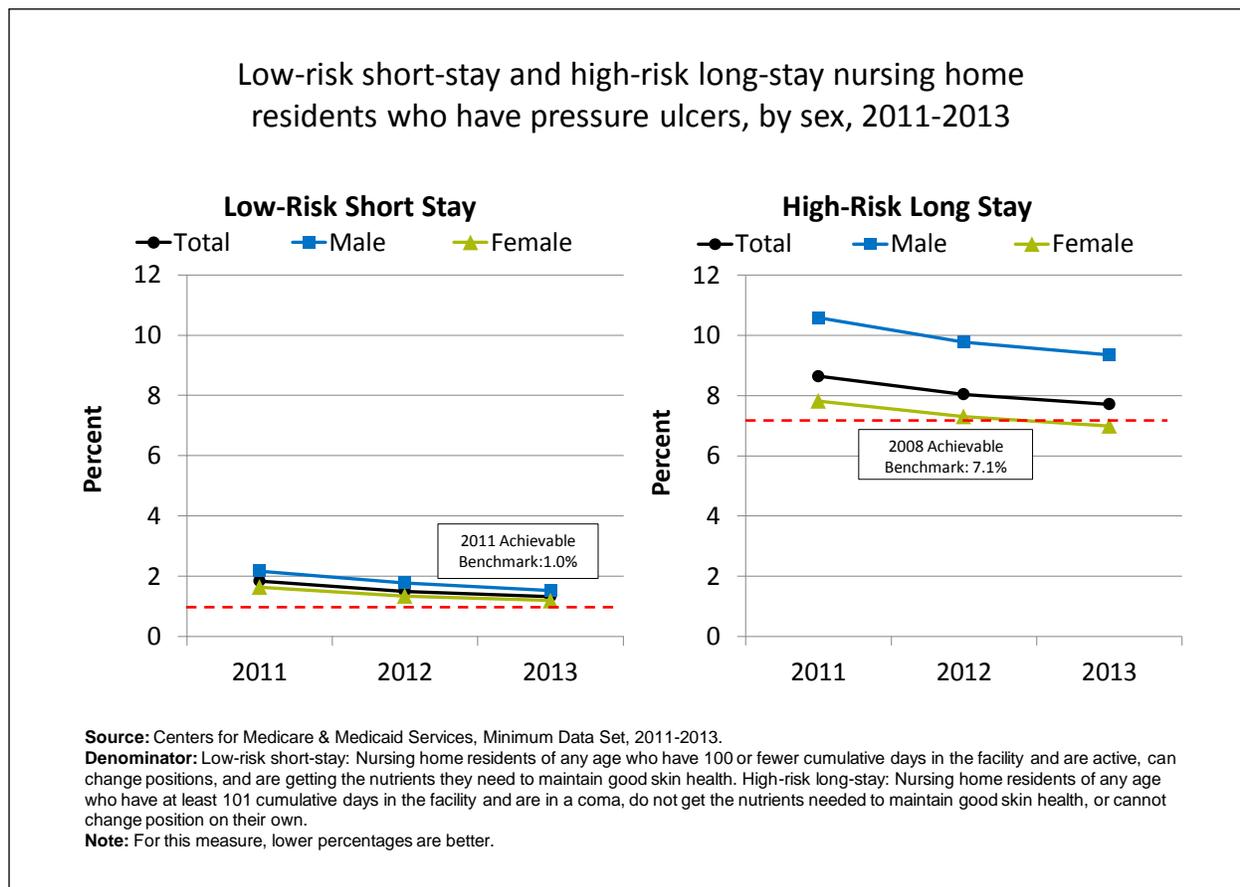
- **Importance:** Bacteria that cause urinary tract infections (UTIs) can spread to other body parts and become more serious or contribute to further complications, such as delirium.
- **Overall Percentage:** In 2013, the percentage of long-stay nursing home residents with a UTI was 6.4%.
- **Groups With Disparities:**
 - In 2013, compared with males (5.1%), the percentage with UTIs was worse for females (7%).
 - In 2013, compared with White residents (6.8%), the percentage of residents with UTIs was lower for Blacks and Asians (4.7%), as well as Hispanics (5.4%).
- **Achievable Benchmark:**
 - In 2011, the top 5 State achievable benchmark for UTIs was 6.1%. The States that contributed to the achievable benchmark are Connecticut, Hawaii, Minnesota, North Dakota, and Pennsylvania.
 - Males, Blacks, Asians, and Hispanics have achieved the benchmark.

Use of Restraints



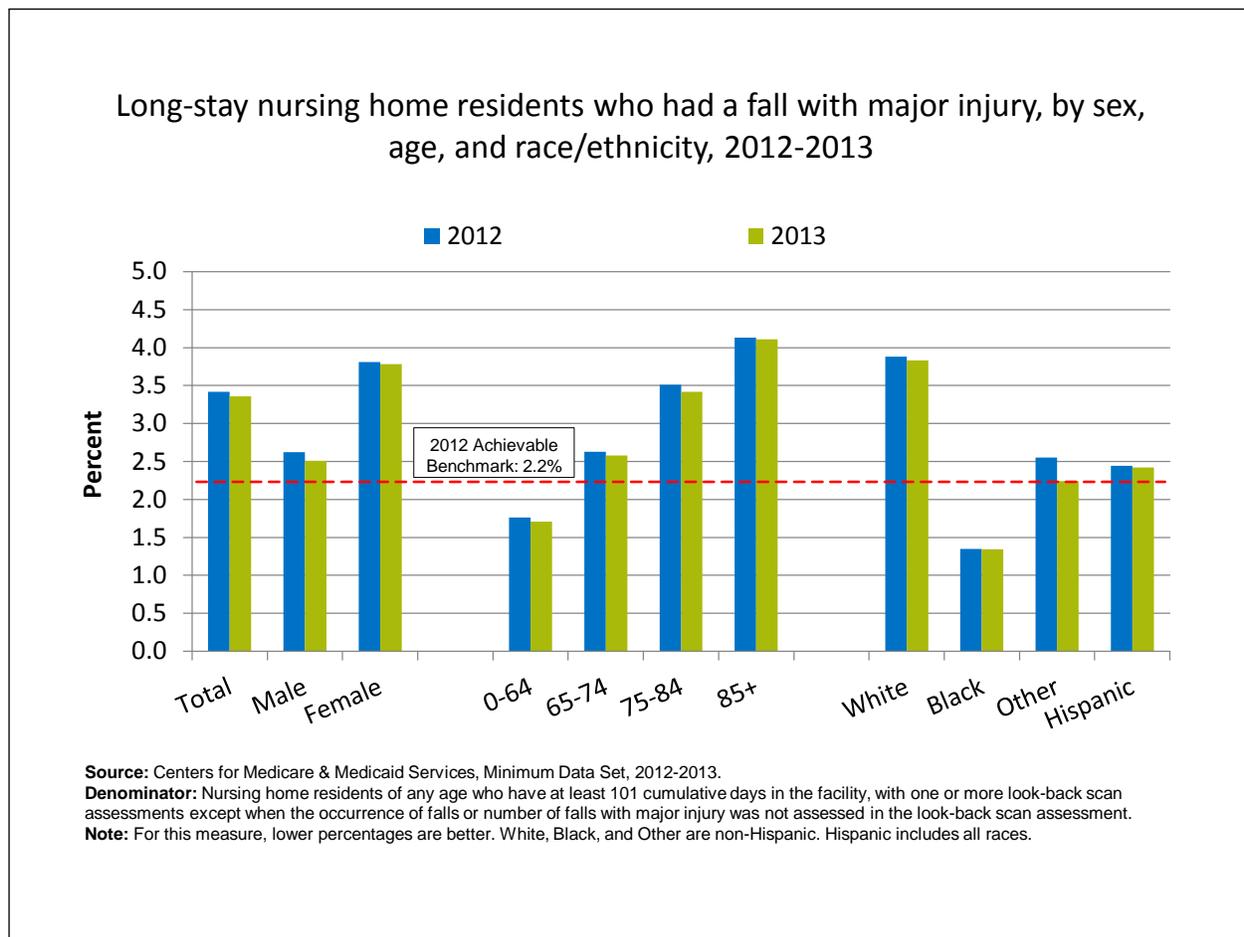
- **Importance:** Residents who are restrained daily can become weak, lose their ability to go to the bathroom by themselves, and develop pressure ulcers or other medical conditions.
- **Overall Percentage:** In 2013, the percentage of long-stay nursing home residents who were physically restrained on a daily basis was 1.4%.
- **Groups With Disparities:**
 - In 2011, 2012, and 2013, the percentage of residents with restraint use on a daily basis was lower for those ages 65-74 years compared with those under age 65. In 2013, the percentage of residents ages 65-74 years experiencing use of restraints was 1.2% compared with 1.6% for residents younger than 65.
 - In 2013, compared with Whites (1.4%), Asians (2%) and Hispanics (1.8%) had worse percentages of daily restraint use and Blacks (1.2%) had a better percentage of daily restraint use.
- **Achievable Benchmark:**
 - In 2011, the top 5 State achievable benchmark for restraint use was 0.7%. The States that contributed to the achievable benchmark are Kansas, Maine, Nebraska, New Hampshire, and Vermont.
 - No group achieved the benchmark from 2011 to 2013.

Pressure Ulcers



- **Importance:** Pressure ulcers are serious medical conditions. They typically result from prolonged periods of uninterrupted pressure on the skin, soft tissue, muscle, and bone. Vulnerable patients include older adults; stroke and diabetic patients; patients with dementia, circulatory diseases, dehydration, and malnutrition; and people who use wheelchairs or are bedridden—that is, any patient with impaired mobility or sensation.
- **Overall Percentage:** In 2013, the percentage of low-risk short-stay residents with pressure ulcers was 1.3% and the percentage of high-risk long-stay residents with pressure ulcers was 7.7%.
- **Groups with Disparities:**
 - As in 2011 and 2012, male low-risk short-stay nursing home residents had a worse percentage with pressure ulcers (1.5%) compared with female residents (1.2%) in 2013.
 - As in 2011 and 2012, male high-risk long-stay nursing home residents had a worse percentage with pressure ulcers (9.4%) compared with female residents (7.0%) in 2013.
- **Achievable Benchmark:**
 - The 2011 top 5 State achievable benchmark for low-risk short-stay nursing home residents was 1.0%. The States that contributed to the benchmark were Alabama, Arizona, Colorado, Connecticut, and Idaho.
 - The 2008 top 5 State achievable benchmark for high-risk long-stay nursing home residents was 7.1%. The States that contributed to the benchmark were Hawaii, Minnesota, Nebraska, New Hampshire, and North Dakota.
 - No low-risk short-stay residents achieved the benchmark from 2011 to 2013. Among high-risk long-stay residents, only females achieved the benchmark by 2013.

Falls

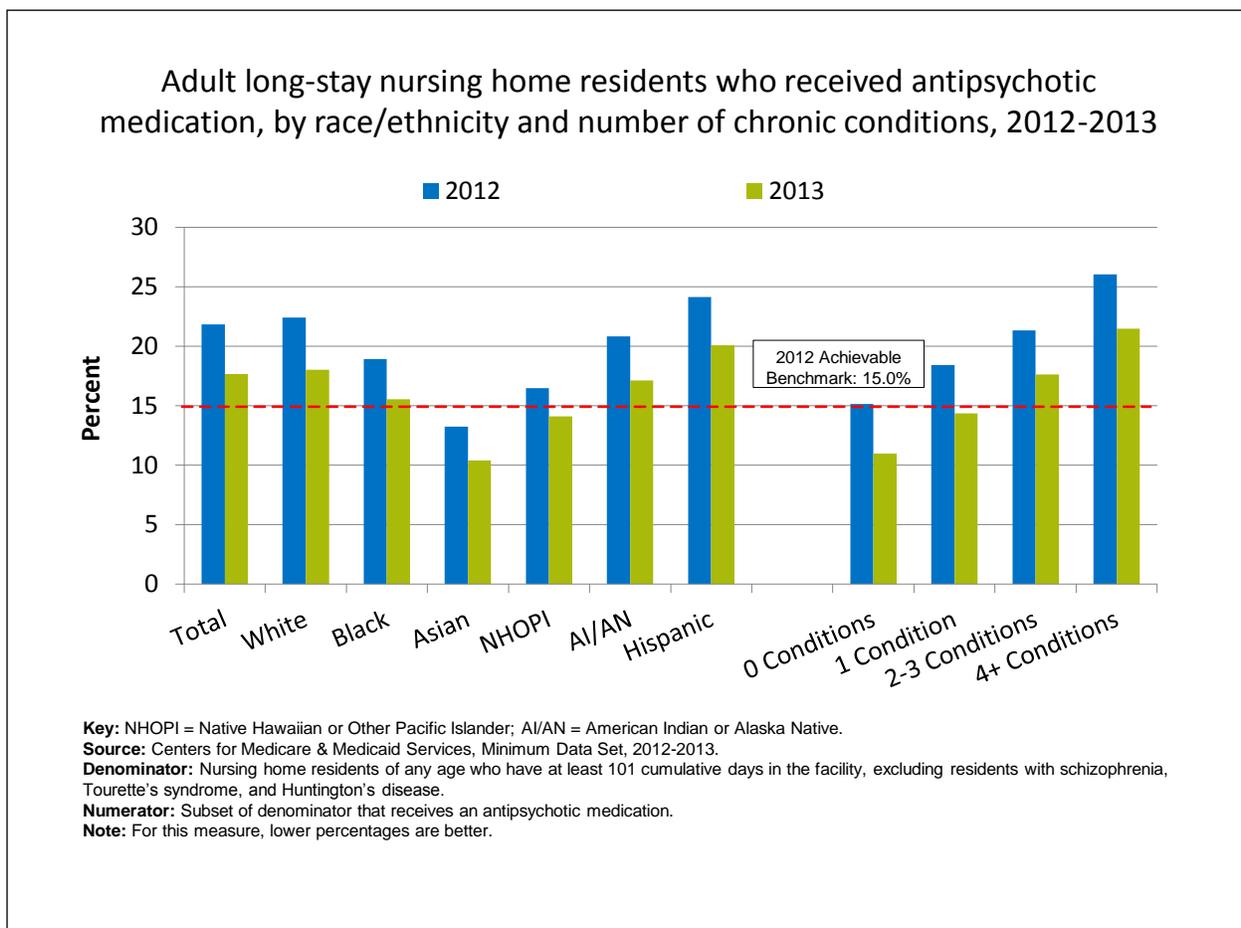


- **Importance:** Nursing home residents who experience falls resulting in major injuries are at higher risk of death and disability, as well as emotional trauma that can affect functional abilities and social well-being.
- **Overall Percentage:** In 2013, the percentage of long-stay nursing home residents who had a fall with a major injury was 3.4%.
- **Groups With Disparities:**
 - In 2013, female nursing home residents had a worse percentage of falls (3.8%) compared with male residents (2.5%).
 - In 2013, the percentage of falls with major injury was worse for all subgroups of residents age 65 years and over compared with their younger counterparts. The percentage for residents under 65 years old was 1.7%, compared with 2.6% for ages 65-74 years, 3.4% for ages 75-84 years, and 4.1% for 85 years and over.
 - Also in 2013, compared with Whites (3.8%), the percentage of falls with major injury was better for Black (1.3%), Other (2.2%), and Hispanic (2.4%) residents.

- **Achievable Benchmark:**

- The 2012 top 5 State achievable benchmark for falls with major injury was 2.2%. The States that contributed to the achievable benchmark are Alaska, California, District of Columbia, Hawaii, and New Jersey.
- The benchmark was achieved by Black residents and those ages 0-64 years.

Antipsychotic Medication Among Nursing Home Residents

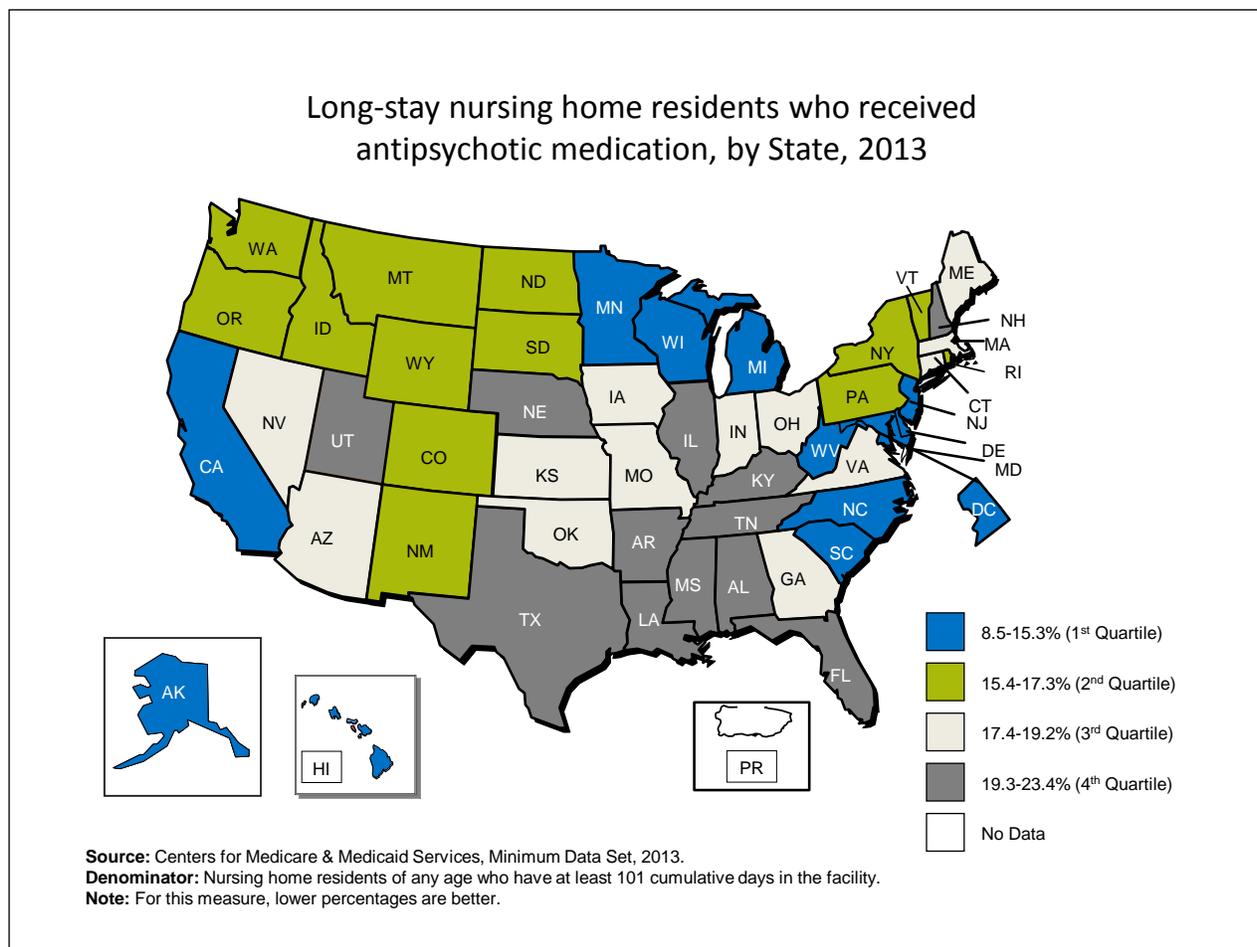


- **Importance:** The high use of antipsychotic medications among nursing home residents for indications other than those for which the drug was approved has been noted by the Federal Government. These drugs are often used for too long, at too high a dose, or when unnecessary. In the past, inappropriate prescribing of antipsychotics in nursing homes has primarily been considered a marker of suboptimal care. Recent studies have shown antipsychotic use is also a drug safety issue (Huybrechts, et al., 2012). Antipsychotic medication use is associated with increased risks of adverse events such as movement disorders, falls, hip fractures, and cerebrovascular events. Their use in older adults with dementia carries an increased risk of death. Safety concerns with antipsychotic medication use in older adults also include the risks of hyperprolactinemia, pneumonia,

thromboembolism, cerebrovascular events, and other cardiovascular adverse events (Chiu, et al., 2015).

- **Overall Percentage:** The percentage of long-stay nursing home residents who had antipsychotic medications was 17.6% in 2013.
- **Groups With Disparities:**
 - In 2013, the percentage of residents receiving antipsychotic medication was higher for Hispanic residents (20.1%) than for White residents (18.0%).
 - In 2012 and 2013, the percentage of long-stay residents who received antipsychotic medications was worse for residents with one or more chronic conditions than for residents with no chronic conditions.
- **Achievable Benchmark:**
 - The 2012 top 6 State achievable benchmark was 15.0%. The States that contributed to the achievable benchmark are Alaska, California, Hawaii, Michigan, New Jersey, and Wyoming.
 - Asians, NHOPIs, residents with no chronic conditions, and residents with one chronic condition achieved the benchmark.

Antipsychotic Medication Among Nursing Home Residents, by State

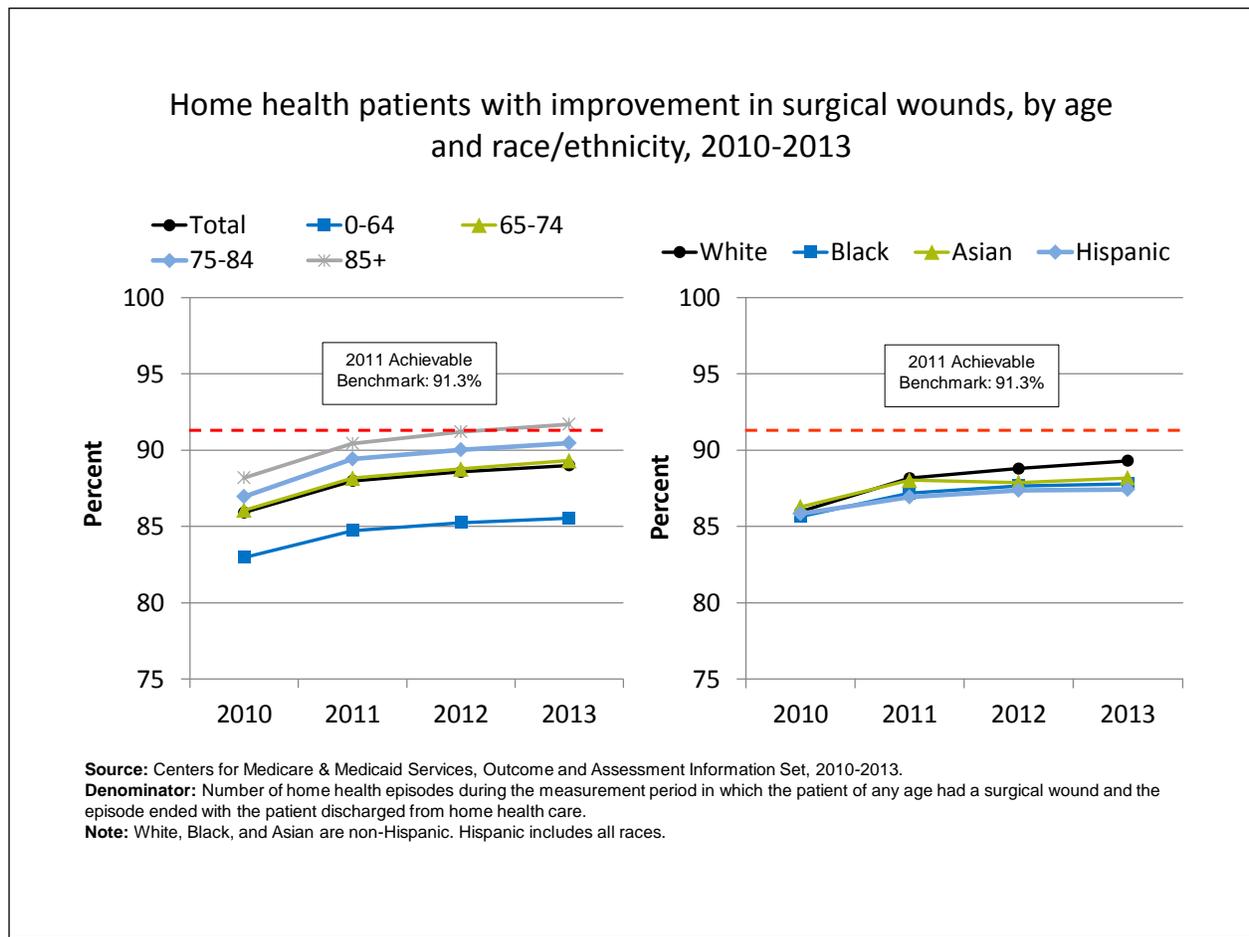


- **Overall:** This map shows overall rankings of States (by quartiles) in the percentage of long-stay nursing home residents who received antipsychotic medication in 2013. Values ranged from 8.5% to 23.4%.
- **Differences by State:** Interquartile ranges follow:
 - First quartile (lowest): 8.5%-15.3% (AK, CA, DC, DE, HI, MD, MI, MN, NJ, NC, SC, WI, WV)
 - Second quartile (second lowest): 15.3% -17.3% (CO, ID, MT, NM, NY, ND, OR, PA, RI, SD, VT, WA, WY)
 - Third quartile (second highest): 17.4%-19.2% (AZ, CT, GA, IN, IA, KS, ME, MA, MO, NV, OH, OK, VA)
 - Fourth quartile (highest): 19.3%-23.4 % (AL, AR, FL, IL, KY, LA, MS, NE, NH, TN, TX, UT)
 - Eight of the 12 States in the quartile with the highest percentage of long-stay nursing home residents who received antipsychotic medication were in the South.

Patient Safety in the Home Health Setting

- Home health agencies provide services to beneficiaries who are homebound and need skilled nursing care or therapy.
- Approximately 12 million individuals receive home health care from more than 33,000 providers for causes including acute illness, long-term health conditions, permanent disability, or terminal illness (NAHCH, 2010).
- Improvements among home health patients can reflect the quality of care from home health agencies.
- Measures include:
 - Home health patients with improvement in surgical wounds.
 - Home health patients with improvements in their ability to take medications orally.

Improvement in Surgical Wounds

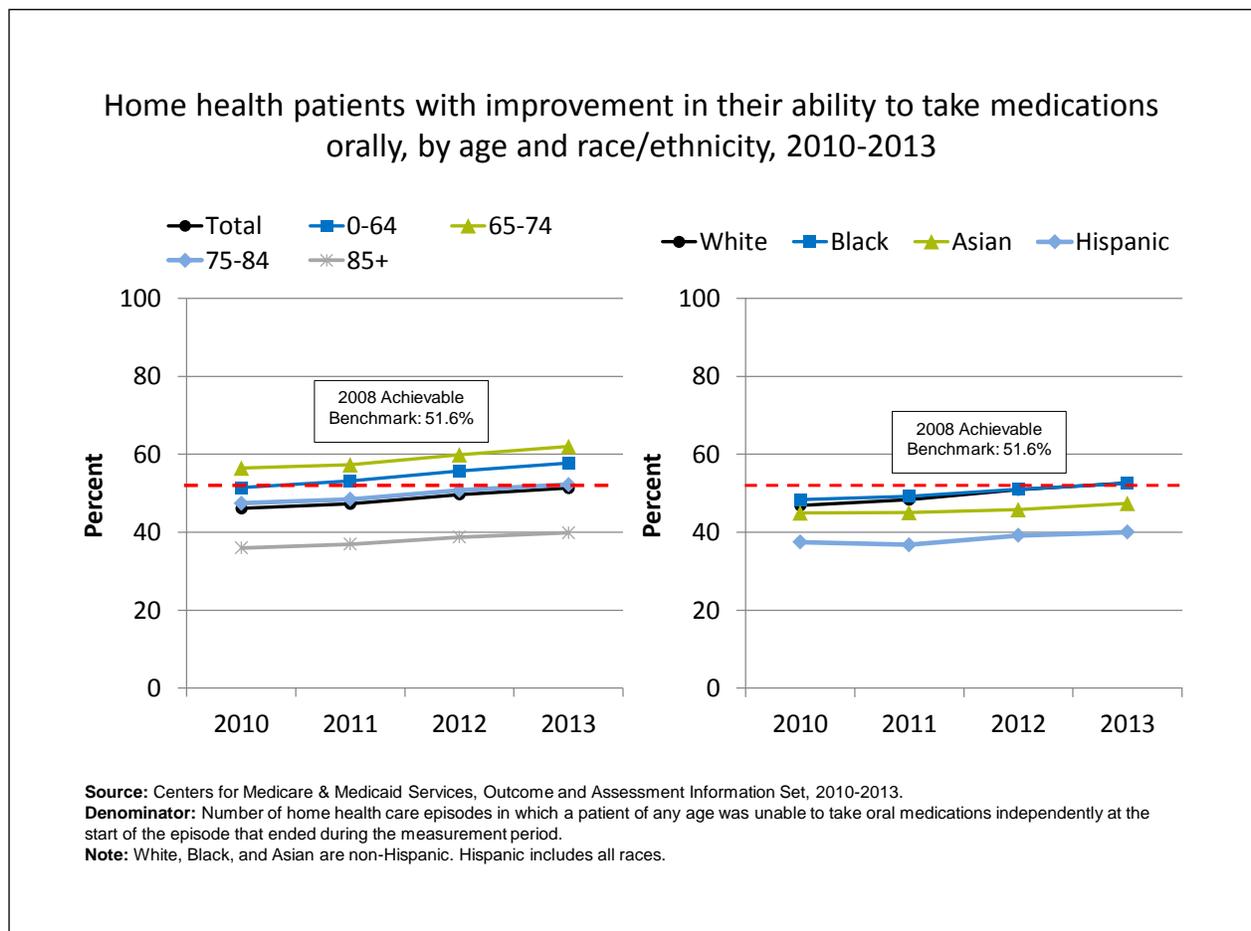


- **Importance:** Normal wound healing after an operation is an important marker of good care. The home health team should regularly change wound dressing and teach the patient about wound care.
- **Overall Percentage:** In 2013, the percentage of home health patients with improvement in their surgical wounds was 89.0%.
- **Trends:** The percentage of health home patients with surgical wound improvement increased between 2010 and 2013.
- **Groups With Disparities:**
 - In 2013, compared with residents under age 65 years (85.6%), all other age groups had better percentages of improvement in surgical wounds. The percentage was 89.3% for ages 65-74, 90.5% for ages 75-84, and 91.7% for ages 85 and over.
 - In 2013, compared with Whites (89.3%), Blacks (87.8%), Asians (88.2%), and Hispanics (87.4%) had worse percentages of improvement in surgical wounds.
 - The 2010 through 2013 trend in the percent of home health patients with surgical wound improvement did not change for those over age 65 relative to persons under age 65 years.

- **Achievable Benchmark:**

- The 2011 top 5 State achievable benchmark was 91.3%. The States that contributed to the benchmark are Alabama, Mississippi, Nevada, Oklahoma, and South Carolina.
- Home health patients age 85 years and over achieved the benchmark for surgical wound improvement in 2013.
- At the current rate of progress, patients ages 75-84 years could reach the benchmark within a year. Patients ages 65-74 years could achieve the benchmark in approximately 2 years.
- White home health patients could achieve the benchmark in approximately 2 years.

Improvement in Ability To Take Medication Orally



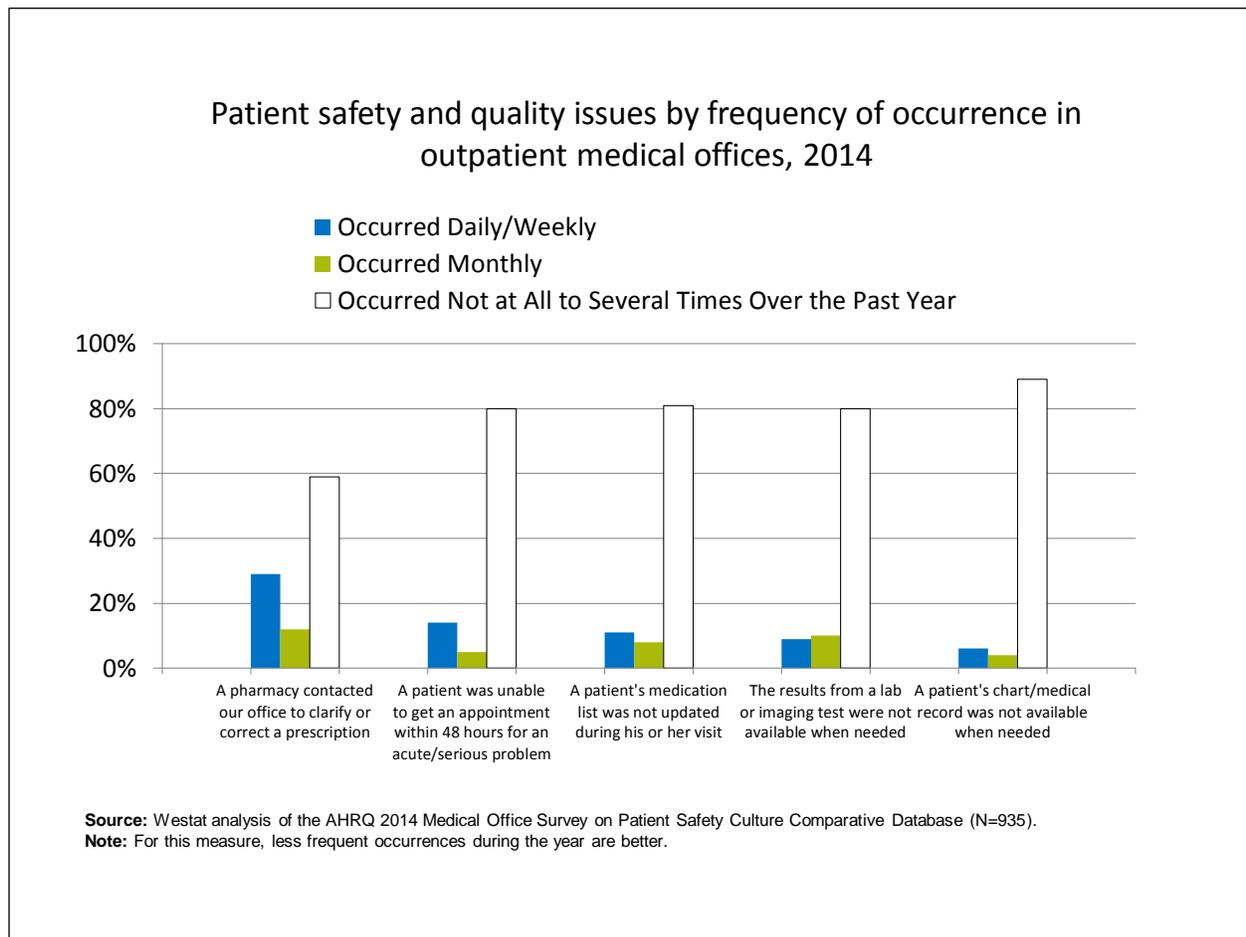
- **Importance:** Taking medications correctly is important to the health status and quality of life of individuals living in the community. The home health team can help teach a patient ways to organize drugs and take them properly.
- **Overall Percentage:** In 2013, the percentage of home health patients with improvement in their ability to take medications orally was 51.3%.
- **Trends:** Between 2010 and 2013, there was improvement in the overall percentage of home health patients with improved ability to take medications orally.

- **Geographic Variation:**
 - In 2013, Hispanic home health patients had worse rates of improvement in taking oral medications than non-Hispanic White patients in 11 States (Arizona, California, Connecticut, Florida, Illinois, Indiana, Massachusetts, Nevada, New York, North Carolina, and Texas).
 - Non-Hispanic White patients had worse rates of improvement than Hispanic patients in five States (Hawaii, Idaho, Iowa, Michigan, and Pennsylvania).

Patient Safety in the Ambulatory Setting

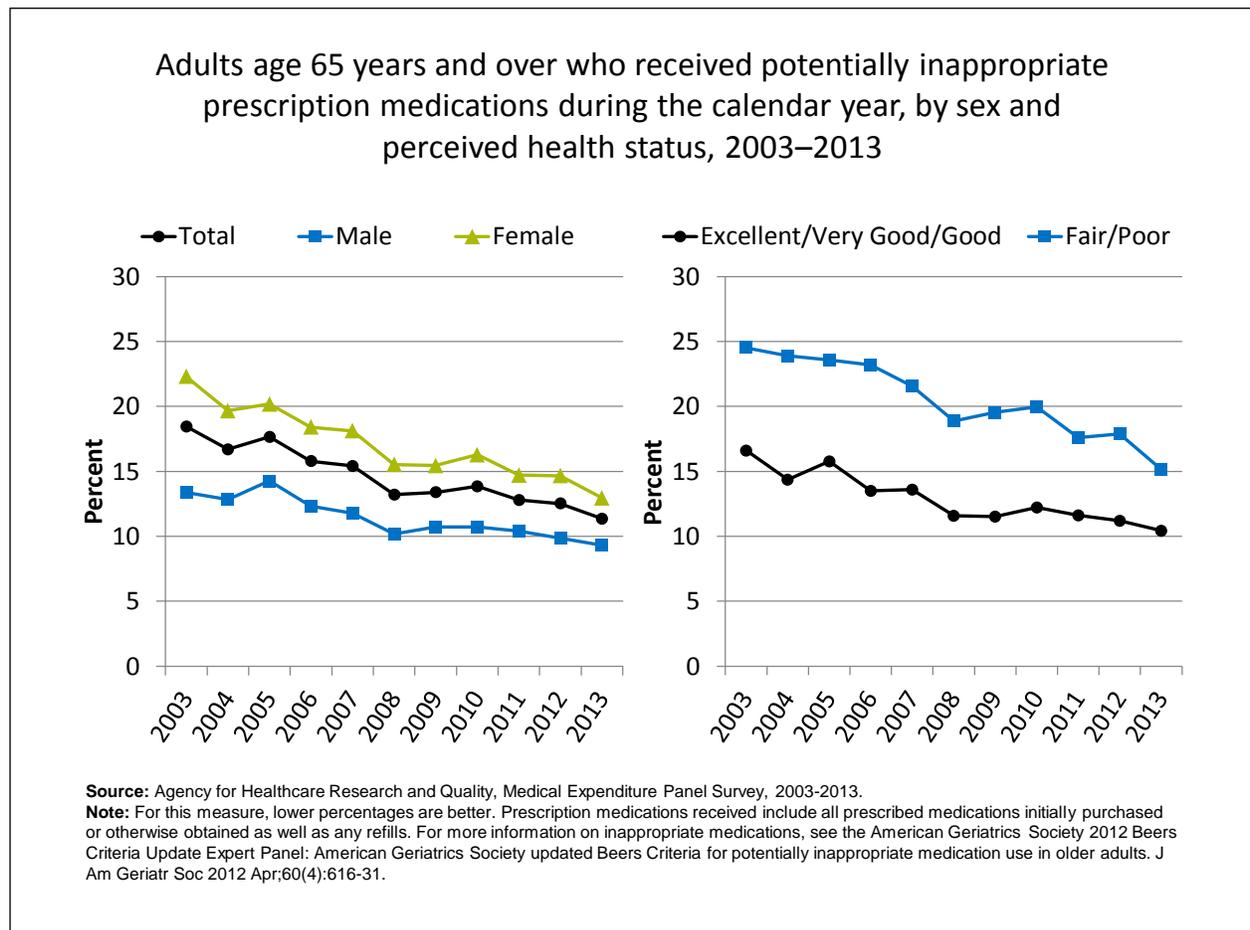
- Although patient safety initiatives frequently focus on inpatient hospital events, adverse effects of medical care may be identified and treated in outpatient settings.
- Adverse effects of medical care can follow care or procedures in hospitals, emergency departments, physician offices, or other settings.
- Measures include:
 - Patient safety and quality issues by frequency of occurrence in outpatient medical offices.
 - Adults age 65 years and over who received potentially inappropriate prescription medications during the calendar year.
 - Percentage of hemodialysis patients with vascular catheter in use for 90 days or longer.
- For more information, see the PSNet link to Patient Safety Primer: Patient Safety in Ambulatory Care. <https://psnet.ahrq.gov/primers/primer/16/patient-safety-in-ambulatory-care>

Patient Safety and Quality Issues



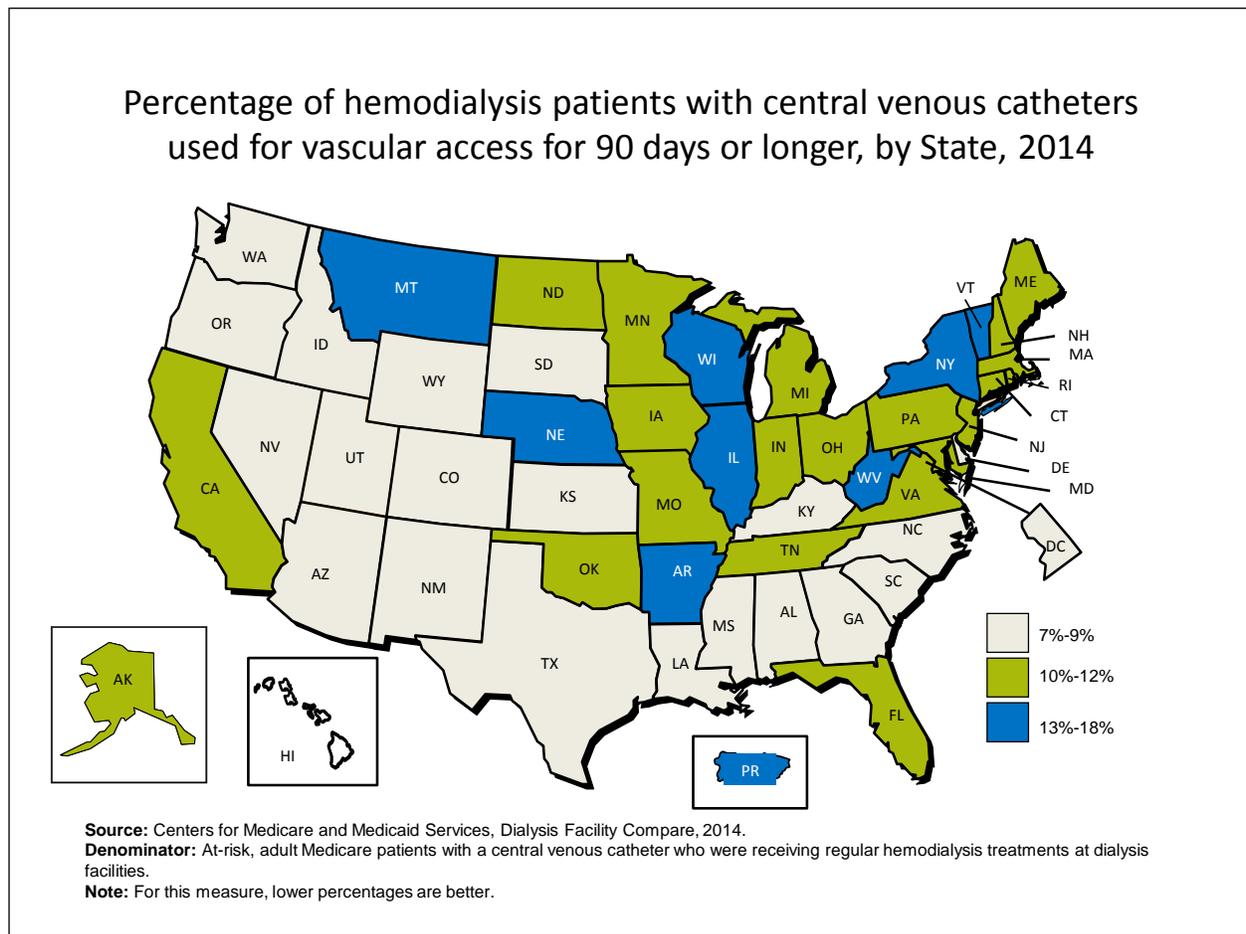
- **Importance:** Most health care takes place in the outpatient, or ambulatory care, setting. Lack of access to care and lack of access to timely and accurate medical information and test results may contribute to patient safety events such as missed or delayed diagnoses, medication errors, failure to order appropriate diagnostic or laboratory tests, incorrect interpretation of tests, and inadequate followup on results.
- **Overall Percentage:**
 - Almost 30% of medical offices participating in the survey reported daily or weekly occurrences of being contacted by the pharmacist for clarification or correction on a prescription.
 - After prescription clarifications or corrections by the pharmacy, medical offices were next most likely to report daily or weekly issues with patients being unable to get an appointment within 48 hours for an acute or serious problem (14%) or the patient's medication list not getting updated during their visit (11%).
 - The share of medical offices reporting that lab or imaging tests were not available when needed reached nearly 20% when considering monthly occurrences as well as those that occurred more frequently.

Potentially Inappropriate Prescriptions for Older Adults



- **Importance:** Some drugs that are prescribed for older patients are known to be potentially harmful for this age group.
- **Overall Percentage:** In 2013, the percentage of adults age 65 years and over who received potentially inappropriate prescription medications was 11.4%.
- **Trends:** From 2003 to 2013, the percentage of adults age 65 years and over who received potentially inappropriate prescription medications improved overall, for both sexes, and for people with excellent/very good/good health status and people with fair/poor health status.
- **Groups With Disparities:**
 - In all years, the percentage of patients receiving potentially inappropriate medications was higher among females compared with males. This gap was not changing over time.
 - In all years from 2003 to 2013, the percentage of patients receiving potentially inappropriate medications was higher among people with fair/poor health status compared with people with excellent/good health status. This gap was not changing over time.

Long-Term Catheter Use in Dialysis Patients



- **Importance:** Central venous catheters are frequently used for vascular access to dialysis patients until a fistula or graft is formed. Central venous catheters have higher rates of infection and adverse events among patients receiving dialysis treatment compared with other forms of vascular access. To decrease the likelihood of adverse events, catheters should be used for less than 90 days.
- **Overall Percentage:** Nationally, an average of 10% of dialysis patients used central venous catheters for 90 days or longer in 2014.
- **Geographic Variation:** In 2014, Alabama and Kansas had the lowest percentages of dialysis patients using central venous catheters for 90 days or longer (7%), and Puerto Rico had the highest percentage (18%) of long-term catheter use.

Patient Safety Infrastructure

- Efforts to improve patient safety have been accompanied by various infrastructure enhancements:
 - Growth in patient safety organizations, which assist providers in detecting and reducing risks and hazards from care delivery that may lead to patient harm
 - System improvement initiatives at the Veterans Health Administration (VHA)

- Development of the National Practitioner Data Bank, a clearinghouse for information on medical malpractice payments

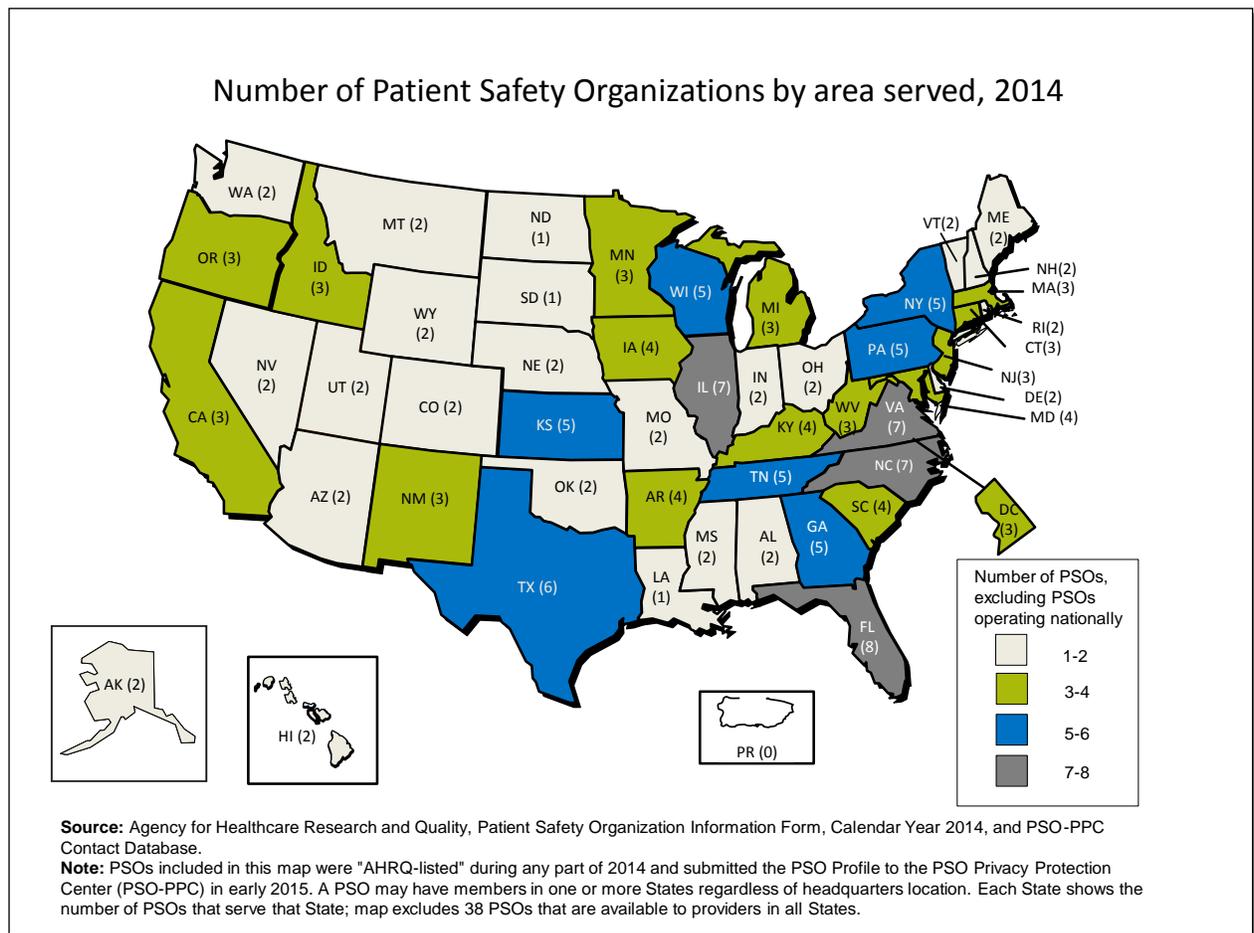
Patient Safety Organizations

- Patient safety organizations (PSOs) aim to reduce preventable adverse events, near misses, and unsafe conditions in all health care settings.
- PSOs provide an environment for health care providers to voluntarily report, discuss, and learn from patient safety events and quality analyses on a privileged and confidential basis.
- Measures include:
 - Number of PSOs serving each State.
 - Variation in concentrations of compounded liquid medications for children.

Patient Safety Organizations: AHRQ Common Formats

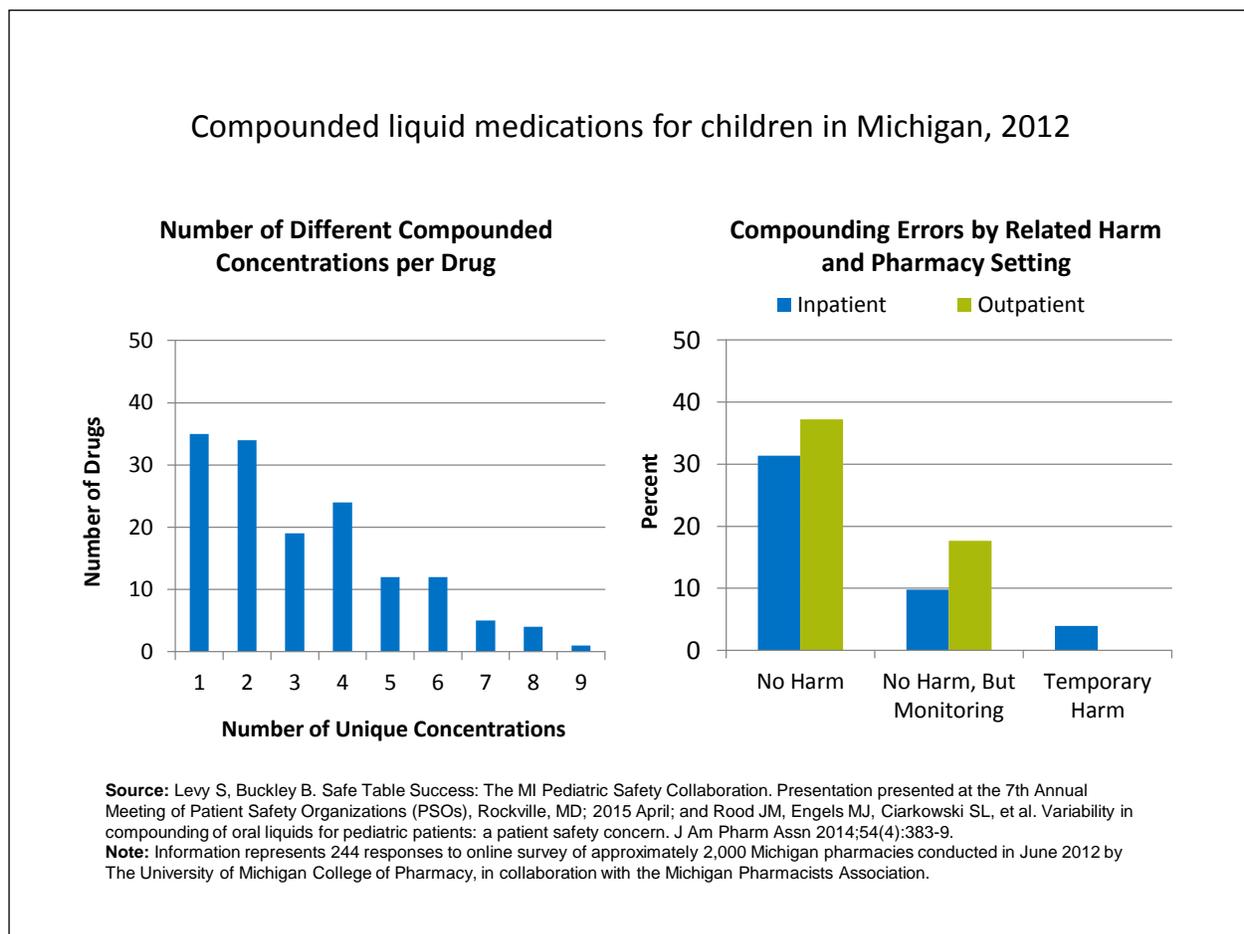
- AHRQ Common Formats provide a standardized method for PSOs, health care providers, and other organizations to collect and report patient safety events.
 - Data element standards are important for aggregating and analyzing events across providers.
- AHRQ Common Formats have been developed for a variety of settings of care:
 - Acute care hospitals
 - Skilled nursing facilities
 - Retail pharmacy
- More information is available at <https://psa.ahrq.gov/common>.

Number of Patient Safety Organizations



- **Importance:** All patient safety organizations (PSOs) have authority to operate in all 50 States and U.S. territories, but not all do. In 2014, 38 PSOs self-reported being available to providers nationally. PSOs not available nationally serve specific States.
- **Geographic Variation:**
 - Nearly all States have at least 2 PSOs available to providers in their State in addition to the 38 national PSOs that serve all States.
 - Florida has the most PSOs available, with 8 in addition to the 38 nationally available PSOs. The States with the largest number of PSOs available are generally on the East Coast (e.g., North Carolina, Virginia, New York, Pennsylvania, Tennessee, Georgia) or have large populations (e.g., Texas, Illinois).
 - North Dakota, South Dakota, and Louisiana are the only states with just one PSO serving their State in addition to the 38 national PSOs.
 - Puerto Rico is served by one national PSO only.

Compounded Liquid Medications for Children



- **Importance:**

- Liquid medications are widely used in pediatrics because many children find it difficult to swallow tablets or capsules. If not commercially manufactured, these liquid medications require a pharmacist to compound them to the correct dosage for the patient. This practice of compounding has led to a variety of medication concentrations in use. In the absence of standard concentrations for compounded medications, there is a risk that children may accidentally receive medications that are too potent and can be dangerous or are too weak to be effective.
- The Michigan Health & Hospital Association Keystone Center Patient Safety Organization hosts five Pediatric Safe Tables each year. Safe Tables provided a confidential and legally protected environment to discuss challenges and improvement strategies regarding inconsistent medication concentrations for compounded oral liquids without fear of punitive action against them.

- **Overall Percentage:**

- More than half (52.7%) of drugs identified in the 2012 survey had 3 or more unique concentrations dispensed to children across Michigan. For example, Rifampin, used to treat bacterial infections, was reported to have 8 different concentrations dispensed to patients.
- Nearly one-third (31.3%) of reported errors caused temporary harm or required additional monitoring despite no harm.

Standardization of Compounded Liquid Medications

Standardization of compounded liquid medications for children in Michigan, 2011

Issue identification:

- Hospitals attending PSO Pediatrics Safe Table raise compounded medication concentrations as a major safety issue
- Small focus group determines extent of problem
- Michigan pharmacies are surveyed about baseline concentrations

Develop Intervention:

- PSO Quarterly Safe Tables are held to discuss cases and practices
- Team develops recommendations for standard concentrations
- Consensus is achieved for frequently compounded pediatric medications: 470 formulations for 147 drug entities are reduced to 104 concentrations for 100 drugs

Practice change:

- Toolkit is created
- Standards are disseminated to Michigan prescribers and pharmacies
- Standards are disseminated to PSO members and Safe Table participants

Michigan Collaborative Standardization of Compounded Oral Liquids

Drug name:	Tramadol	Dosage Form:	Suspension
Concentration:	5 mg/mL	Shelf Life:	90 days
Route:	Oral	Storage:	Room temperature or refrigerator
Volume:	120 mL	Auxiliary Labeling:	Shake well

Ingredients	QS	Quantity	Units
Tramadol 50-mg tablet		12	tablet
Ora-Plus/Ora-Sweet SF*	Y	qs ad 120	mL

Directions:

1. Triturate
2. Levigate
3. Add base
4. Transfer
5. Rinse th
6. Add base
7. Transfer
8. Shake w

Michigan Collaborative Standardization of Compounded Oral Liquids

Drug name:	Rifampin	Dosage Form:	Suspension
Concentration:	25 mg/mL	Shelf Life:	28 days
Route:	Oral	Storage:	Room temperature or refrigerator
Volume:	120 mL	Auxiliary Labeling:	Shake Well

Ingredients	QS	Quantity	Units
Rifampin 300-mg capsule		10	capsule
Ora-Sweet/Ora-Plus*	Y	qs ad 120	mL

Directions:

1. Open capsules and empty contents into a mortar.
2. Triturate contents to a fine powder.
3. Levigate with a small amount of base solution to form a paste.
4. Add base solution in increasing amounts while mixing thoroughly.
5. Transfer contents of the mortar to a graduated cylinder.
6. Rinse the mortar and pestle with base solution and pour into graduated cylinder.
7. Add base solution to the graduated cylinder to achieve the desired volume.
8. Transfer contents of the graduated cylinder to a clean container.

Source: Michigan Health & Hospital Association Keystone Center Patient Safety Organization; and University of Michigan College of Pharmacy, State-Wide Initiative to Standardize the Compounding of Oral Liquids in Pediatrics.

- **The Role of PSO Safe Tables:** Based on adverse medication events discussed in the Michigan Health & Hospital Association (MHA) Keystone Center Patient Safety Organization (PSO) Safe Tables in July 2011, the Michigan Pediatric Safety Collaboration was developed to further assess the scope of the problem and formulate a solution.
- **The Collaborative:** The Michigan Pediatric Safety Collaboration includes individuals from the University of Michigan College of Pharmacy, the Michigan Pharmacists Association (MPA), the Food and Drug Administration (FDA), and the MHA Keystone PSO.

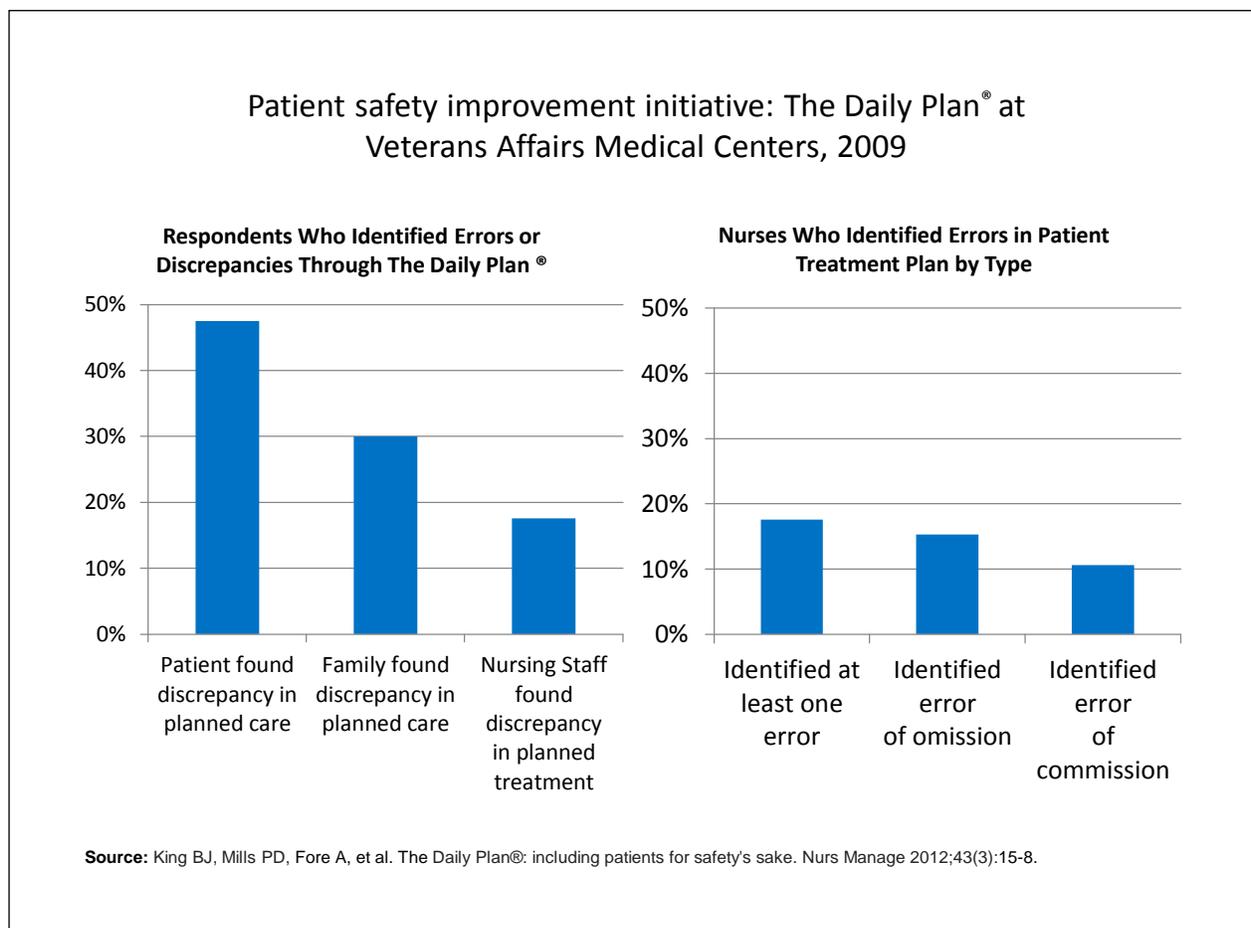
- **Practice Change:**

- As a result of the standardization effort, 470 unique formulations for 147 drug entities were reduced to 104 different concentrations for 100 drugs.
- The Michigan Pediatric Safety Collaboration developed a multistep process to implement standards for compounding medications. The MPA surveyed pharmacies in Michigan to better define the nature and scope of the problem. The PSO continued to act as convener. The result was the creation and dissemination of statewide standards for 120 frequently compounded pediatric medications.

Veterans Health Administration

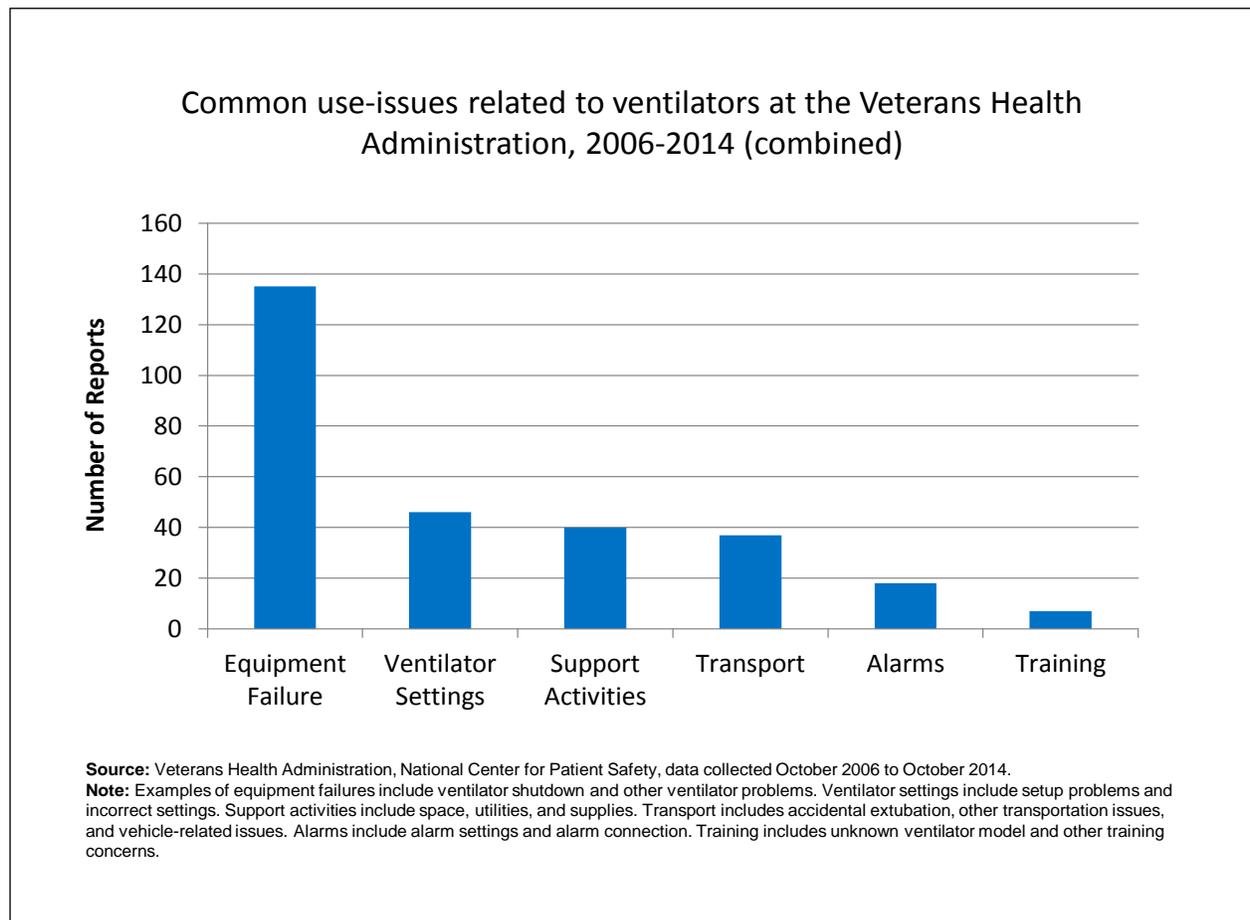
- The National Center for Patient Safety is part of the Veterans Health Administration, the Nation’s largest integrated health care system.
- Patient safety-related system improvement initiatives include:
 - The Daily Plan®.
 - Purchasing for Safety Initiative.

Patient Safety Improvement Initiative



- **Importance:** The Daily Plan[®] is a two-page printed summary that acts as a schedule for patients and providers each day. It shows the procedures, laboratory tests, and medications scheduled for that day and lists essential health information such as patient's name, allergies, and current medications. It can be tailored for a patient's needs by extracting orders from the electronic medical record (EMR). The Daily Plan[®] is intended to facilitate patient and family engagement throughout the course of care. The Daily Plan[®] shows promise for improving patient safety. Since 2009, the VA has implemented The Daily Plan[®] in more than 65 hospitals, both inpatient and outpatient care settings. The Daily Plan[®] is shared more than 75,000 times a month, and the VA plans to continue the spread of The Daily Plan[®] at additional sites in 2016.
- **Findings:**
 - As part of a pilot test, in 2009, a total of 198 patients and 85 nurses responded to a survey across 10 facilities. Nurses had an average of 3.4 patients per shift who received The Daily Plan[®]. Patients responded about their own experiences, whereas nurses reported about all of their patients who received The Daily Plan[®].
 - Nearly half (47.5%) of patients reported finding a discrepancy in planned care through The Daily Plan[®]. In addition, 30% of patients reported that their family members found a discrepancy. Although not every discrepancy will be a potential medical error, having a shared understanding of the plan of care decreases the risk of error.
 - More than one in six nurses (17.6%) identified a discrepancy in treatment among their patients through The Daily Plan[®]. Most of these nurses (15.3%) found one or more errors of omission, and a smaller share (10.6%) of nurses found one or more errors of commission; some found both.

Issues Related to Ventilators



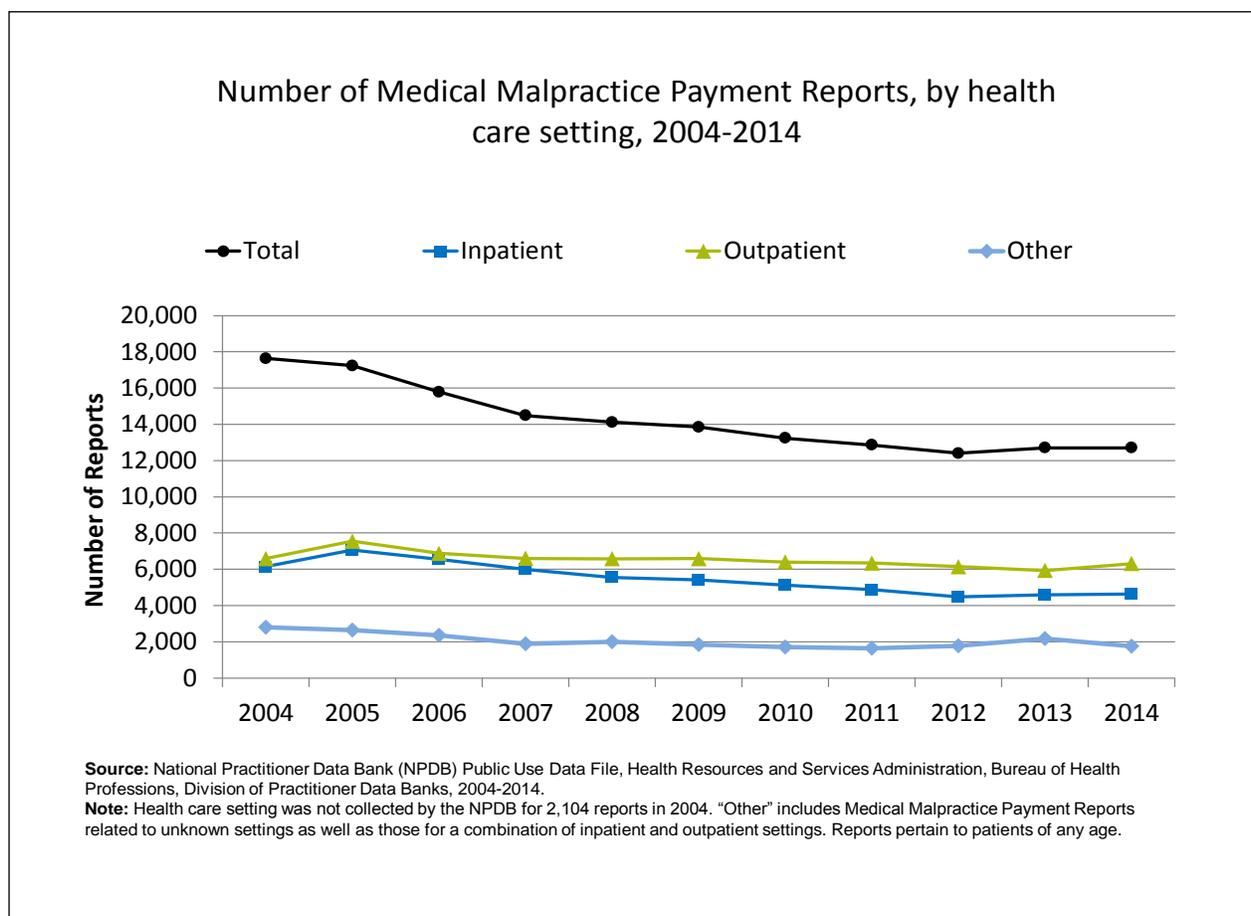
- **Importance:** Beginning with a focus on ventilators, the Veterans Health Administration’s human factors-based Purchasing for Safety Initiative communicates the most common use-issues associated with medical devices in order to ultimately remove or contain identified vulnerabilities and prevent further harm.
- **Event Reporting:** Patient safety managers report events and close calls from more than 150 VA facilities to a national database. The largest number of use issues related to ventilators involved equipment failure and issues such as spontaneous ventilator shutdown, compressor failure, and broken or missing parts. Other categories of ventilator use issues involved the physical space where the ventilator was used, challenges of transporting patients on ventilators, and problems with ventilator settings and alarms. Root cause analyses on reports are conducted, and Patient Safety Alerts are issued to share the learning internally.
- **Other Key Components:**
 - Data on ventilator issues from the VA and the Food and Drug Administration’s Medical Product Safety Network are the basis for a “government-industry day” to work with manufacturers. This information is used to help the device manufacturers better understand the limits of human use of their products.

- The VA also trains nonclinicians—such as biomedical engineers across the organization—to understand the devices, consider the situation for their use, and identify what can go wrong (“failure modes”) in advance.
- The VA encourages discussions among clinicians about their experience in using devices. In the Applied Patient Safety Challenge, hundreds of staff participate in brainstorming about solutions and strategies for dealing with unexpected scenarios involving devices.

National Practitioner Data Bank

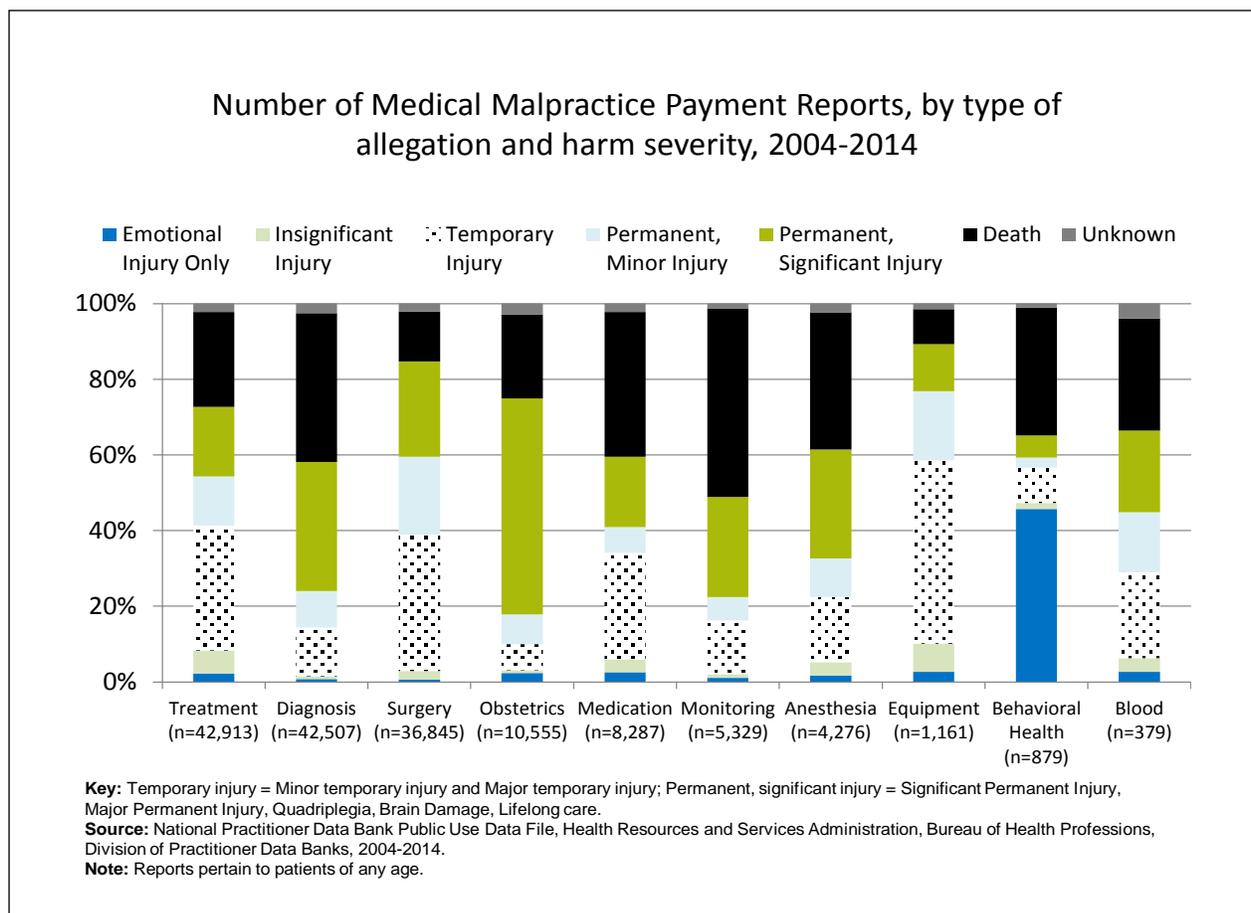
- Medical malpractice actions are one way to flag potential medical errors.
- Medical Malpractice Payment Reports are submitted to the National Practitioner Data Bank by medical malpractice payers:
 - Report of a monetary exchange made for the benefit of a physician, dentist, or other health care provider
 - Result of a settlement or judgment of a written complaint or claim based on that provider’s delivery of or failure to deliver health care services

Number of Medical Malpractice Payment Reports, by Setting



- **Trends:** The total number of medical malpractice payment reports (MMPRs) per year decreased from 17,641 in 2004 to 12,699 in 2014.
- **Variation Across Reports:**
 - Of 157,022 MMPRs from 2004 through 2014, more reports related to care in the outpatient setting (71,937) than in the inpatient setting (60,391).
 - Diagnosis-related and treatment-related payments were the most frequent types of reports, each accounting for about 27% of cases. Reports of payments for medication-related cases accounted for only 5% of MMPRs (data not shown).

Number of Medical Malpractice Payment Reports, by Allegation and Harm



- **Overall Percentage:** From 2004 to 2014, medical malpractice payments were made for allegations related to:
 - Treatment (42,913),
 - Diagnosis (42,507),
 - Surgery (36,845),
 - Obstetrics (10,555),
 - Medication (8,287),
 - Monitoring (5,329),

- Anesthesia (4,276),
 - Equipment or products (1,161),
 - Behavioral health (879), and
 - IV and blood products (379).
- **Variation Across Reports:**
 - Death accounted for more than one-third of harm in payments related to monitoring (49.9%), diagnosis (39.3%), medication (38.3%), and anesthesia (36.3%) allegations.
 - More than half of all obstetric payments were for allegations of permanent, severe harm (57.0%).
 - Temporary harm accounted for more than one-third of payments related to equipment (48.5%) and surgery (36.0%).
 - Most of the behavioral health-related payments were for emotional harm (45.7%) or death (33.8%).

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